

AFRL-PR-WP-TR-2000-2015

(Supercedes AFRL-PR-WP-TR-2000-2021)

**FUEL AND FUEL SYSTEM
MATERIALS COMPATIBILITY TEST
PROGRAM FOR A JP-8 +100 FUEL
ADDITIVE**

**Volume 1: Thermal Stability Additive Package
BetzDearborn SpecAid® 8Q462**



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OCTOBER 2001

Final Report for 01 June 1994 – 29 July 1999

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(ASC-03-0531)**

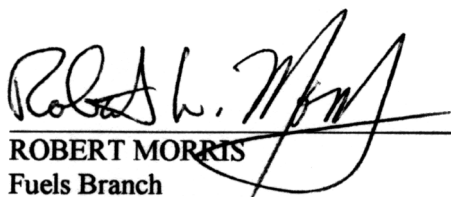
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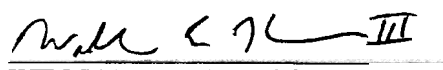
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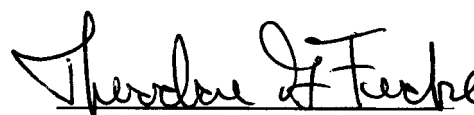
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REPORT DOCUMENTATION PAGE					Form Approved OMB No. 0704-0188	
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1. REPORT DATE (DD-MM-YY) October 2001		2. REPORT TYPE Final		3. DATES COVERED (From - To) 06/01/1994 – 07/29/1999		
4. TITLE AND SUBTITLE FUEL AND FUEL SYSTEM MATERIALS COMPATIBILITY TEST PROGRAM FOR A JP-8 +100 FUEL ADDITIVE Volume 1: Thermal Stability Additive Package BetzDearborn SpecAid® 8Q462 (Supersedes AFRL-PR-WP-TR-2000-2021)				5a. CONTRACT NUMBER F33615-92-C-2207		
				5b. GRANT NUMBER		
				5c. PROGRAM ELEMENT NUMBER 62203F		
6. AUTHOR(S) Dexter Kalt, Marlin Vangsness, Benjamin Wilt, Susan Saliba, and John Dues (UDRI) Alan Fletcher and Larry Perkins (AFRL/MLSA) Steven Anderson (AFRL/PRTG)				5d. PROJECT NUMBER 3048		
				5e. TASK NUMBER 05		
				5f. WORK UNIT NUMBER AH		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> University of Dayton Research Institute 300 College Park Dayton, Ohio 45469-0001 </div> <div style="width: 45%;"> AFRL/MLSA AFRL/PRTG </div> </div>				8. PERFORMING ORGANIZATION REPORT NUMBER UDR-TR-97-01A		
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) Propulsion Directorate Air Force Research Laboratory Air Force Materiel Command Wright-Patterson Air Force Base, OH 45433-7251				10. SPONSORING/MONITORING AGENCY ACRONYM(S) AFRL/PRTG		
11. SPONSORING/MONITORING AGENCY REPORT NUMBER(S) AFRL-PR-WP-TR-2000-2015				12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution is unlimited. (ASC-03-0531)		
13. SUPPLEMENTARY NOTES Report contains color. Much of the report is a series of tables that contain test data. Work was also performed on this project under Contract number F33615-97-C-2719 (JON 304804AM). (Supersedes AFRL-PR-WP-TR-2000-2021.)						
14. ABSTRACT (Supersedes AFRL-PR-WP-TR-2000-2021.) This report describes a program inaugurated to test the compatibility of aircraft fuel system materials with a JP-8 fuel containing a new thermal stability additive (TSA) package. The JP-8 fuel containing this new TSA is commonly referred to as JP-8 +100. (The “+100” refers to the expected 100 °F increase in thermal stability range of fuel containing the additive over the thermal stability range of JP-8 fuel.) In this test report, the effects of fuel containing BetzDearborn - 8Q462 TSA (JP-8 +100) in normal and x 4 concentrations levels on over 222 different aircraft fuel systems materials are measured in comparison to the effects of JP-8 fuel on the same materials. The BetzDearborn - 8Q462 fuel additive package incorporates a dispersant/detergent, a metal deactivator and an antioxidant compound which reduces the rate of oxidation and deterioration of fuel at higher temperatures. Within airframe and engine fuel systems and fuel storage and handling equipment, materials including metallics, elastomerics, composites and other nonmetallics are found in contact with aviation fuel. This report describes many of these materials and physical property changes observed in these materials after thermal aging in aviation fuel containing the BetzDearborn - 8Q462 TSA package in laboratory experiments.						
15. SUBJECT TERMS Jet fuel, JP-8, physical property measurements, compatibility, thermal stability additive package, fuel/material aging						
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT: SAR	18. NUMBER OF PAGES 388	19a. NAME OF RESPONSIBLE PERSON (Monitor) Robert W. Morris 19b. TELEPHONE NUMBER (Include Area Code) (937) 255-3527	
a. REPORT Unclassified	b. ABSTRACT Unclassified	c. THIS PAGE Unclassified				

TABLE OF CONTENTS

SECTION	PAGE
List of Tables	<i>iv</i>
Review and Coordination	<i>v</i>
Abstract	<i>vi</i>
Acknowledgments	<i>vii</i>
Appreciation	<i>viii</i>
Executive Summary	1
I. BACKGROUND	3
A. General	3
B. Materials	6
C. Control and Test Fuels	7
D. Test Fuel Additives	7
E. Test Equipment / Procedures	8
F. Material / Fuel Property Tests	9
1. Non-Metallic Property Tests	9
2. Material Physical Properties Test Methods	10
3. Metallic Property Tests	11
4. Material Physical Properties Test Methods and Descriptions	12
5. Fuel Property Tests	14
G. Data Collection	14
II. DATA PRESENTATION	15
Re-Test Results for JP-8 + 100 BETZ (TSA) Additive	16
Test Evaluation Criteria	17
III. TEST RESULTS	20
IV. CONCLUSIONS	28
V. RECOMMENDATIONS AND SHORT MATERIALS LISTING	31
VI. REFERENCE DOCUMENTS	34
VII. PHOTOGRAPHS AND TEST RESULT DATA SHEET SAMPLES (Figures 1 - 8)	38
VIII. TEST RESULT SUMMARY SHEETS (28 Days / 7 Days) 1-25	47
IX. TEST RESULT DATA SHEETS (28 Days / 7 Days)	73

LIST OF TABLES

	PAGE
Table 1. Material /Physical Properties Test Methods	10
Table 2. Re-Test Results for JP-8 + 100 Betz (TSA) Additive Method Compatibility Comparisons of 93-POSF-2980 vs. 92-POSF-2926	16
Table 3. Test Evaluation Criteria	17

REVIEW AND COORDINATION

The data and text contained in this report have been reviewed and the results, conclusions and recommendations agreed to as below:

Reviewed and Coordinated



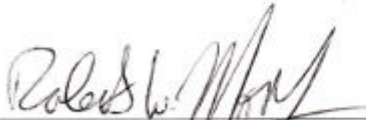
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ABSTRACT

This report describes a program inaugurated to test the compatibility of aircraft fuel system materials with a JP-8 fuel containing a new thermal stability additive (TSA) package. The JP-8 fuel containing this new TSA is commonly referred to as JP-8 + 100. (The “+100” refers to the expected 100 °F increase in thermal stability range of fuel containing the additive over the thermal stability range of JP-8 fuel.) In this test report, the effects of fuel containing Betz/Dearborn SpecAid® 8Q462 TSA (JP-8 + 100) in normal and (x) 4 concentration levels on over 222 different aircraft fuel systems materials are measured in comparison to the effects of JP-8 fuel on the same materials. The Betz/Dearborn - 8Q462 fuel additive package incorporates a dispersant / detergent, a metal deactivator and an antioxidant compound which reduces the rate of oxidation and deterioration of fuel at higher temperatures.

Within airframe and engine fuel systems, materials including metallics, elastomerics, composites and other non-metallics are found in contact with aviation fuel. This report describes many of these materials and physical property changes observed in these materials after thermal aging in aviation fuel containing the Betz/Dearborn SpecAid® 8Q462 TSA package in laboratory experiments. These changes are evaluated in comparison to: 1) physical properties of materials aged in a JP-8 baseline fuel; and 2) physical properties of materials before fuel aging. The tests were designed to replicate temperatures to which the materials and the specific fuels would be subjected in airframes and engines. Two challenges existed in designing the tests. The first challenge was designating a concise test period so that testing of a large number and wide variety of materials could be completed within a moderate amount of time. An additional challenge was choosing a test period long enough that the results could be judged to be meaningful, i.e. to reasonably replicate “real world”, in situ, use of the materials. A 28 day thermal aging period (with 7 day fuel change out) was selected as a manageable test period, i.e., practical for completing several test thermal stability additives while allowing sufficient time to observe the thermal degradation of the material over that test duration.

The test materials represent the following use categories: 1) aircraft fuel systems; 2) ground servicing and containment equipment; and 3) storage vessels. The aircraft materials include those used in fuel system tanks and in associated components (pumps, fuel lines, connectors, sealants, locking devices) as well as metallic alloys used in fuel lines and engine components up to the combustion chamber. The testing centered on the degradation of the physical properties of the materials. In some cases, the materials’ effect on the fuel, e.g., conductivity, gums, acid number and hydroperoxides also is reported. For metallic materials, the concentration in the fuel of the specific elements present in the alloy are measured after thermal aging.

Early in the program, two objectives were identified. The first was to determine whether the new TSA would be compatible with fuel system and engine materials in the higher temperature fuel environments projected for a new generation of aircraft. The second was to determine whether the new TSA would be compatible with fuel system and engine materials in the (presumably) lower fuel temperatures of aircraft in current inventory.

ACKNOWLEDGMENTS

Susan Saliba, UDRI
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Fuel preparation / handling

APPRECIATION

The depth and breadth of this program required the formal participation and cooperation of many individuals from differing disciplines and organizations. In addition, advice was solicited from a wide variety of other sources. The knowledgeable inputs of these individuals was invaluable. Their generosity in reviewing test results, offering the benefits of their experience, critiquing, advising and supporting this effort have helped to make this program possible. Special mention must be made of the unselfish support provided by Alan Fletcher, Joe Leone, Larry Perkins, John Dues, Benjamin Wilt and Arthur (Skip) Behme. The kind guidance and assistance of Steve Anderson, William Harrison, Dr. Ival Salyer, Robert Kauffman, Robert Morris, Edward Binns, Ellen Strobel, Marlin Vangness and Dr's Shawn Heneghan and Dilip Ballal are gratefully acknowledged.

The gathering of test materials for this effort represented a monumental assignment in investigation of fuel systems, identification of materials and acquisition of appropriate test samples. The cooperation and generosity of airframe and hardware manufacturers eased the task considerably. They include: Pratt & Whitney, General Electric, Argo-Tech, Deleval (Wiggans), XAR Industries, Auto Valve, The Boeing Company (military and commercial, Wichita/Seattle/Everett), McDonnell Douglas St. Louis, Lockheed Aircraft Company, J. C. Carter Co., Allied Signal Aerospace (Bendix), Rolls Royce, Shaw Aero Devices, SAE AE-5 Committee, Parker Hannifin Co., The Crest Co., Foamex Co., H. R. Textron Inc., B.F. Goodrich, Ragan Data Systems, Green Tweed, Parker Seal, DuPont, Engineered Fabrics, Amfuel and Durodyne Inc.

This work was supported by the United States Air Force under Contract No. F33615-92-C-2207 with Mr. Charles Frayne serving as the contract monitor.

EXECUTIVE SUMMARY

OBJECTIVE

(Supersedes AFRL-PR-WP-TR-2000-2021.)

The objective of this evaluation is to determine by *comparative* thermal aging tests and analyses whether a thermal stability additive package in JP-8 fuel deteriorates the contacted fuel system materials to the extent that there is any significant degraded system performance as compared to the currently used JP-8 fuel.

SCOPE

The scope of this report includes an examination of the compatibility effects of the thermal stability fuel additive on certain fuel system materials and illustrations of the critical importance of the material use and selection criteria for fuel system materials which experience the temperature variances of the air vehicle environment. The Air Force inventory includes an extensive number of both older and newer aircraft types and models. More than two hundred twenty-two materials which come in contact with fuel have been identified for the evaluation.

METHODS

The current methods for evaluating materials which come in contact with fuel are generally separated into two basic categories: a) methods used for evaluating **metallics**; and b) methods used for evaluating **non-metallics**. Physical properties such as tensile, elongation, hardness, volume swell, compression set, etc. are typical criteria for evaluating the integrity of elastomeric materials after thermal aging in fuel. Physical properties such as weight change and corrosion are typical for evaluating the condition of metallic materials after thermal aging in fuel. The tests were conducted with small representative material coupons and with the materials being static (in a free state) i.e. in a non-component system application. The static (free state) thermal aging tests of the materials which come in contact with fuel provide a practical method of comparing the thermal stability additized test fuel (JP-8 + 100) results to a control JP-8 fuel results. To further complement this testing, a JP-8 fuel with the thermal stability additive 4x concentration provides additional data for trend observations and any impact of accidental over-concentration of the thermal stability additive. (The 4x concentration applies only to the detergent/dispersant component in the additive package.) ASTM D4054 and D-2-1137 requires the evaluation results to be based on a 4x fuel additive concentration as compared to the baseline JP-8 test results.

In addition to changes to the physical properties of the materials, selected fuel properties were measured that might be influenced by material deterioration and corrosion. Fuel properties examined after thermal aging included acid number, gums, hydroperoxides, conductivity and elemental analysis.

EVALUATION CRITERIA

The evaluation criteria established for each material are based on direct comparisons of test results using: 1) normal concentration of thermal stability additive (TSA) in the test fuel; 2) 4x concentrations of TSA in the test fuel; and 3) JP-8 fuel (the control fuel). The TSA fuel test results were required to be equal to or better than the JP-8 test results. When test fuel / non-metallic test results were below the JP-8 non-metallic test results, a second comparison was made using developed acceptable tolerances. These acceptable tolerances were developed by applying experience and judgment in a case by case scenario.

TEST RESULTS

The **Betz/Dearborn (SpecAid® 8Q462)** thermal stability fuel additive does not significantly degrade any of the materials tested based on the static test results evaluated. The summary table (Section VIII) of this report highlights the results of those materials tested and evaluated.

Materials were aged at test temperatures in TSA fuels and in JP-8 control fuel. Test results were examined and compared. A selection of materials that failed, were re-tested at lower temperatures. An assessment was made of the comparative effects of TSA fuels and JP-8 control fuel on the materials' properties.

When, in examining the test data, it was determined that out-of-specification/tolerance results were the result of higher test (fuel) temperatures, an OT (over temperature) evaluation was used to identify that test result. Consequently, materials which exhibited acceptable results in lower temperatures but unacceptable results in higher temperatures were identified. The OT designation allows the test data to be useful in determining acceptability of the TSA on two different applications: 1) new generation aircraft that may generate higher fuel temperatures; and 2) aircraft in the current inventory where comparatively lower fuel temperatures are experienced.

Betz/Dearborn additive (SpecAid® 8Q462) was judged to be acceptable with those materials tested.

ADDITIONAL TESTING

While the evaluation of materials in a static state (non-component system application) are valuable, appropriate and necessary, they may not predict material performance in an actual aircraft application. For example, degradation in a physical property and/or corrosion which ultimately results in fuel leakage and/or component malfunction may not be evident in a laboratory test. The correlation between static (free state) aging and performance in an ***actual aircraft component*** is a part of the overall program evaluation. A flowing test rig has been constructed to test materials in their component and sub-assembly applications i.e. in the configuration in which they are used in actual aircraft. These tests will complement the static tests by introducing some of the mechanical factors and elemental interaction factors of the actual aircraft component / fuel flow system application. In addition, the practical impact of the materials' physical property static test results can be observed, e.g., whether compression set to a given measurement causes the component to leak.

The test and evaluation of all these materials in *all* dynamic applications is impractical. Consequently, the materials to be tested in their applications are selected based on the static test results. Dynamic fuel flow test results currently are underway. Those tests are incomplete at this reporting and will be a part of a future report.

ADDITIONAL REPORTING

The metallic microscopic tests / evaluations used to assist this evaluation are too extensive to be included in this report. That work will be published in an AFRL/MLSA report.

I. BACKGROUND

A. GENERAL

History

Fuel temperatures in high performance aircraft are increasing as a result of using the aircraft bulk fuel as a heat sink to cool aircraft sub-systems. Higher thermal stability fuels are available; however, the cost has been prohibitive for a wide usage fuel such as JP-8. The use of an additive which would increase the JP-8 thermal stability by up to 100°F at a fraction of the cost of high thermal stability fuels such as JP-7 and JP-TS could be of great benefit to the Air Force and to future aircraft designers. Increased thermal stability of fuel through incorporation of an additive at very low concentrations (parts per million) should also result in benefits to existing aircraft which have experienced engine coking problems with the introduction of JP-8 fuel.

Test Program Development

This program was initiated on the heels of the higher acid number fuel material evaluation. Some refineries in Alaska had requested a deviation from the fuel acid number in the specifications while they were producing both JP-4 and JP-8 as they changed from JP-4 to JP-8 production. A material compatibility test program was conducted to determine whether such a temporary deviation could be allowed for JP-8. Some of the ground work established for that evaluation was adopted for this program. A 28 day aging test period and an airframe fuel system temperature of 160°F was selected for that program. This test temperature is an increase over the 140°F standard temperature for most previous fuel system material tests. A task to identify a comprehensive material list and appropriate test temperatures was also initiated in view of the anticipated thermal stability additive program.

Prior to the initiation of the thermal stability additive package materials evaluation, several weeks of development tests were conducted. It was necessary to establish a method of evaluating a large number of materials at elevated temperatures up to 400°F for aging periods of 28 days with a minimum number of fuel change-outs. A schedule of fresh fuel changes (initial fuel and three changes-outs) one/week during the 28 day test was considered an acceptable and reasonable goal that did not incur a major program schedule impact.

Fuel deterioration was a primary concern over the sustained period of time under static temperatures of 325°F and up to 400°F. (Severe degradation may interfere with the ability to draw conclusions on the additives' impact on a material.) Fuel color was used as a qualitative method of judging the fuel after 7 days at a sustained high temperature. An initial temperature of 325°F resulted in a fuel color change similar to that of simulated aircraft recirculated engine fuel test rig results (light amber). Experiments indicated that the factors that affected fuel color (an indicator for fuel deterioration) were: a) pressure; b) limiting introduction of oxygen / air; c) thermal cycling; and d) inclusion in the test chamber of an open container of fuel-soaked sand.

Early tests were conducted in a closed pressure vessel with no positive or negative pressure applied. However, the sealed fuel container heated within the closed pressure vessel developed pressure changes (fuel expansion) during the test period. At the conclusion of each test heat cycle, the return to ambient temperature caused the seals to be broken on some fuel test containers allowing introduction of air. It was learned that maintaining ambient pressure by venting the pressure vessel during the test aided in maintaining the seal integrity of the test fuel containers and helped to protect the fuel from deterioration. Thermal cycling also resulted in oxygen / air introduction into the test containers. Thermal cycling of the fuel may be caused by oven or pressure vessel power outages. An open container of fuel soaked sand placed within the pressure vessel proved to be a necessary agent in maintaining test fuel integrity.

Minimizing oxygen introduction into the fuel / material container successfully maintained fuel at a light amber color at 325°F, and preliminary tests at 365°F provided a reasonable indication that the fuel could retain a light amber color at 400°F temperatures. Those techniques which minimized oxygen introduction into the fuel / material container thus minimizing fuel deterioration were documented and used throughout the program.

Fuel exposure to air at elevated temperatures for a long period of time will result in the formation of corrosive materials (peroxides, aldehydes, ketones, acids, etc.) at levels far greater than routinely seen in an aircraft. Fuel autoxidation was controlled in these experiments (control autoxidation) to levels similar to those found on aircraft under recirculated conditions.

Test Hardware Selection

Stainless steel pressure vessels equipped with exterior heating jackets were selected as test chambers for 250°F to 400°F tests. The pressure vessels were maintained in an unpressurized condition and vented to the test cell low pressure vent. The pressure vessel structural integrity was also protected with a pressure relief valve. Ovens were generally used for fuel temperatures of 225°F or less.

Later in the program, in order to increase the number of material tests at 325°F, a new larger oven was equipped with a fuel containment insert to insure fuel / vapors did not come in contact with the oven heating coils. A nitrogen blanket was maintained by bleeding nitrogen around the oven interior continuously throughout the test. This provided a slight positive pressure exterior to the fuel containment insert to avoid any possibility of fuel / vapor leaks onto the oven heating coils.

The ovens and pressure vessels were protected against over-temperatures with temperature controllers. Generally, these were set 15°F higher than the test temperature. The test containers (capped jars containing materials and fuels) and fuel soaked sand in an open tempered glass container were placed in the pressure vessels and ovens.

Tempered glass jars were selected to hold the test material samples and the test fuel in which they were immersed. Rounds cut from thin (0.01”), rigid Teflon sheet to the exact dimensions of the tops of the jars were used as covers and held in place with standard jar rings. The Teflon seal expanded and contracted as vapor pressure changes occurred while maintaining the jar seal, minimizing air / oxygen entry into the fuel. Most non-metallic materials tests conducted at 200°F and lower were conducted by UDRI personnel on campus at the Kettering Laboratories. They used aluminum foil as a seal in lieu of thin Teflon.

Fuel System Test Materials Identification

The fuel system test materials identified and selected for this test were those which come in contact with fuel on a continuous basis. Materials which may only be wetted inadvertently and on a limited, intermittent basis were not included in this test program due to the absence of validated test methods and the absence of baseline fuel data. Aircraft airframe and engine fuel systems and refueling equipment are the primary sources of test material identification. These materials are found in aircraft fuel containment fuel system components and lines up through the engine fuel nozzles and combustion chamber as well as the aircraft ground and aerial refueling systems. Due to the potentially wide use of JP-8 + 100, it was necessary to consider materials from current and future aircraft. In view of having a standard battlefield fuel and aerial refueling tanker operations involving both the intra-service and international communities, all military aircraft fuel system materials are potentially impacted by this program. As a result of this potential, a wide scope investigation for fuel system material identity was pursued. The Society of Automotive Engineers (SAE) / AE-5 committee, airframe / engine manufacturers, DoD personnel and fuel system component manufacturers were contacted to assist in identifying fuel system materials. The original list of fewer than thirty materials grew to 222 materials, including 90 metallics and 132 non-metallics. Some of these materials may be located on both the lower airframe temperature range, 160°F to 225°F, and on the engine with temperature ranges from 250°F to 400°F.

Material Selection Criteria

In some cases, listed materials were not tested. These materials are designated in the summary chart as NT (no test planned). These materials may be found in aircraft and/or ground refueling (storage handling systems), but were not tested for the following reasons:

1. material did not represent the worst case (less likely to be adversely affected by the fuel/temperature aging process than other, similar materials that were tested)
2. material was no longer available or in production;
3. neither the material nor source could be identified. However, in many cases, a similar material (same family of materials) was tested and evaluated;
4. material was similar in chemical composition to another material that was tested;
5. materials mentioned in this report which are associated with a component or special test configuration will be tested and the results included in a separate report covering fuel system components application fuel flow test stand results. That report may include such items as fuel quantity gauging systems probes / electronics, fuel “O” rings, engine fuel pump bearings, etc. This testing is intended to establish a correlation between static test results and component application of the materials, primarily with JP-8 fuel, and is not intended as part of the TSA evaluations.

Test Temperature Identification

Two primary test temperatures were selected for this material compatibility test program. An airframe temperature of 200°F was chosen since engine fuel recirculation back to the airframe fuel tanks is likely on new high performance aircraft. A temperature up to 325°F is currently experienced by many aircraft engine and associated fuel system component materials. Other test temperatures were evaluated when materials were unable to sustain the higher temperatures; i.e. 275 / 250 / 180 / 160°F. A 400°F temperature was evaluated when a material exhibited successful compatibility at 325°F and the material could likely be used in a higher temperature environment.

Test Duration Identification

A test duration of 28 days was considered the most practical to assess such a large number of materials. Some early evaluations accomplished at 7 days indicated significant material property changes. Some of this 7 day data is included in the data sheets to illustrate material property changes between the 7 and 28 day periods. The correlation of 28 days static material exposure tests at a specific temperature to an actual aircraft fuel system component environment has not been established. However, the results of this test are primarily intended as a comparison of fuels with and without a thermal stability additive package and any negative or positive effects of that additive package. Material temperature limitations at a specified test duration also may be gleaned from the test results.

B. MATERIALS The materials selected for this evaluation were grouped in the following categories and assigned an Test Plan Identification number:

Test Plan Identification Numbers beginning with “**I.**” Generally Represent Airframe Use

Test Plan Identification Numbers beginning with “**II.**” Generally Represent Engine Use

The following identifies categories of materials with the identification numbering system employed for these tests:

I.A. <i>Adhesives</i>	I.I. <i>Electrical Wire Insulation/Misc.</i>
I.B. <i>Bladder Tanks</i>	I.J. <i>Joining Materials (Welding, Brazing)</i>
I.C. <i>Coatings (tanks)</i>	I.K. <i>Miscellaneous Coatings, Name Plates, Bearings, Surface Lubricants</i>
I.D. <i>Sealants (tanks)</i>	I.L. <i>Locking Compounds</i>
I.E. <i>Composites</i>	I.M. <i>Metallics (Airframe)</i>
I.F. <i>Filters / Foams</i>	II.M. <i>Metallics (Engine)</i>
I.G. <i>Gaskets (“O” rings) Airframe</i>	I.O. <i>Floats (Level Control Valves)</i>
II.G. <i>Gaskets (“O” rings) Engine</i>	I.P. <i>Potting Compounds (Electrical Connectors)</i>
I.H. <i>Hoses (Ground and Aerial Refueling)</i>	

C. CONTROL AND TEST FUELS

For this materials compatibility test program, Jet A fuels were used as the baseline / control fuels and also as the fuel for the thermal stability additives. The Air Force identifies each fuel by an identification number. The numbers for the fuels selected for this evaluation are 93-POSF-2980 and 92-POSF-2926. Both fuels met the specification requirements of ASTM D1655. The 93-POSF-2980 is a Merox treated fuel. The 92-POSF-2926 is a hydro treated fuel which oxidizes at a greater rate than the 93-POSF-2980 fuel. All Jet A fuel was converted to JP-8 by incorporating JP-8 additives. These additives included an icing inhibitor, Diegme, 0.12 volume %; a corrosion inhibitor, 15 mg/l; and a static dissipater, Stadis 450, 2 mg/l. Although testing of the fuel for conductivity indicates that in many cases the fuel did not meet the minimum of 150 pS/m, absolute conductivity of the fuel was not considered critical. Rather, maintaining the same amount of Stadis 450 in all test fuels was considered critical.

All the materials designated I.M, II.M, I.J, I.K. and I.O were tested with 93-POSF-2980 1994 through December '96. The non-metallics were tested with 93-POSF-2980 with the exception that the baseline control fuel materials after May 1995 were tested with 92-POSF-2926. All testing after Dec '96 was accomplished with 92-POSF-2926 fuel, since the Air Force 93-POSF-2980 supply of Jet A fuel had been depleted. Fuel property measurements for acids, hydroperoxides and gums were accomplished early on for several materials to determine whether any correlation existed between these fuel properties changes and material degradation.

D. TEST FUEL ADDITIVES

The thermal stability additive test package for this program was provided by the Betz/Dearborn Company. The additive is identified as SpecAid® 8Q462. This thermal stability additive package includes a dispersant/detergent (d/d), a metal deactivator (MDA) and an anti-oxidant (BHT). The metal deactivator (MDA) additive is the conventional chemistry, N,N-disalicylidene-1,2 - propane diamine, currently approved for both commercial and military jet fuel. For the purposes of this test program, the MDA was used @ 10 mg/l. The antioxidant used was BHT at a concentration of 25 mg/l. The detergent/dispersant was used at 100 mg/l for normal concentration and 400 mg/l for 4x. Normal concentrations are 100 mg/l d/d and 25 mg/l BHT and 10 mg/l MDA. The 4x concentrations are 400 mg/l d/d and 25 mg/l BHT and 10 mg/l MDA.

For this test program report, Volume I, only the Betz/Dearborn SpecAid® 8Q462 additive is evaluated and reported. Additional reports and special component application tests will be published for each JP-8 +100 thermal stability additive package evaluated.

During this program, the Betz/Dearborn SpecAid® 8Q462 thermal stability additive package was evaluated at two concentrations: 1) normal concentration and 2) 4x concentration. The MDA and BHT concentrations remained constant for the Betz 8Q462 additive. **In the text, data pages and supporting documents of this report, "Betz" (excepting references to the additive manufacturer), "BetzDearborn" and "Betz TSA" as applied to a fuel or fuel additive shall be construed to represent fuel containing BetzDearborn SpecAid® 8Q462 or the BetzDearborn SpecAid® 8Q462 additive itself. The context of the usage will provide a clear distinction between fuel and fuel additive.**

Most testing involved: 1) a baseline JP-8 fuel as a control, 2) JP-8 +100 (with thermal stability additive package in normal concentrations), 3) and JP-8 +100 4x (with detergent/dispersant additive at four times normal concentrations).

E. TEST EQUIPMENT / PROCEDURES

The test equipment for higher temperature evaluations (325°F - 400°F) consisted of 4 pressure vessels with heating jackets, programmable digital temperature controllers and separate over-temperature controllers. The test system was designed and assembled by the UDRI personnel, as shown in Figure # 1. These pressure vessels are designed for safe operation over 400°F. The vessels were fitted with a removable flat shelf for accommodating six quart-size jars around the circumference and one in the center (filled with fuel-soaked sand) for a total of seven jars (See Figure # 2) Ovens at the University of Dayton Kettering Laboratories and WPAFB B-490 also were utilized to accommodate lower temperature fuel tests i.e. 225°F and lower. One environmental chamber equipped with a specially designed fuel/vapor isolation insert in the fuel/materials laboratory, B-490 WPAFB, was utilized for testing up to 325°F. With this modification, the oven could accommodate considerably more test materials than the pressure vessels (See Figure # 3.)

Non-metallic test samples were placed and/or suspended in approximately 700 ml of fuel in Teflon-sealed (or aluminum foil capped), quart canning jars. (See Figure # 4, illustration of “O” - rings suspended and compression set fixtures.) The samples were marked for identification with silver pencils. Generally, five test samples were used for non-metallic materials. An average of the five test sample readings was calculated and reported. An exception was the compression set data for “O” rings which involved two specimens. With some materials, only one test specimen (data point) was required e.g. foam resistivity.

Metallic material test samples were placed in separate 30 ml beakers and marked with sample identification information. In most tests, the metallic test coupons were 1” x 2” x 0.063” specimens. Three test specimens (placed in separate, marked beakers) of a given material generally were used in this test. The beakers were placed inside Teflon-capped, quart jars with 700 ml of fuel. Weight measurements of the samples were made before and after the 28 day test period. The average weight of the three test samples was calculated and reported. (See Figure # 5) A test iteration for metallics included a total of ten (10) specimens, three specimens of a given material in each of the three test fuels, and one specimen as a control (new) material. The four pressure vessels could accommodate eight materials to be tested simultaneously. (Two different materials per pressure vessel.)

F. MATERIAL / FUEL PROPERTY TESTS

1. Non-Metallic Property Tests

Non-metallic material properties are measured to evaluate the materials' ability to perform in component applications. Due to the magnitude of this test program, only a limited number of properties could be evaluated for each material. Those key properties that could give easy identification of degradation were selected for each type of material. These properties were measured for the new, unstressed material samples (control materials) and thermally aged materials. The thermally aged material samples were exposed to the following fuels: 1) the control fuel (JP-8); 2) JP-8 +100; and 3) in JP-8 +100 4x. The material properties after 28 day aging in the JP-8 +100 and in JP-8 +100 4x were compared to its properties after 28 day aging in the JP-8 control and to the properties of new, unstressed material samples. Any negative / positive effects of the +100 additive were noted. Material specifications were reviewed and used to help establish allowable limits for changes in material properties.

Selection of Test Methods The tests selected were designed to give an indication of material degradation with a minimal amount of testing. Tests of common physical properties of the materials related to the degradation of the function of the materials were selected. For example, for coatings, pencil hardness was selected as an easy test that demonstrated whether the additive weakened the coating. For "O" rings, tensile/elongation, volume change, hardness and compression set were chosen as indicators of degradation.

Table 1. lists the physical properties chosen for evaluation of the materials' condition after thermal aging.

TABLE 1.**2. Material/Physical Properties Test Methods**

<u>CATEGORY IDENTITY</u>	<u>MATERIAL</u>	<u>PHYSICAL PROPERTIES</u>
I.A.	Adhesives	Lap Shear, Cohesive
I.B.	Bladders	Tensile / Elongation / Volume Swell
I.C.	Coatings	Pencil Hardness / Tape Adhesion
I.C. / I.D.	Coatings / Sealants	Tensile / Elongation / Volume Swell / Shore A Hardness / Peel Strength / Cohesion
I.D.	Sealants (non-curing)	Rupture Pressure / Volume Swell
I.E.	Composites	Inner Laminar Shear
I.F.	Foam (ESM)	Tensile / Elongation / Resistivity
I.G./ II.G.	Gaskets (“O” Rings)	Tensile / Elongation / Volume Swell / Shore Hardness / Compression Set
I.H.	Hoses	Tensile / Elongation / Volume Swell / Shore A Hardness
I.I.	Electrical Wire Insulation (Film) a) film b) wire	a) Tensile / Elongation b) Wet Dielectric
I.K.	Miscellaneous	Visual Observations and Other
I.L.	Locking Compounds	Torque
I.O.	Floats	Float Ability / Visual Observations
I.P.	Potting Compounds a) epoxy b) film/slab c) connector	a) Lap Shear / Cohesion b) Tensile, Elongation, Volume Swell, Hardness, Peel Strength, Cohesion c) Insulation Resistance

The preceding physical property tests, material preparation and test procedures generally were accomplished in accordance with MIL-HDBK-149B and the following specifications and military guidance documents:

<u>TEST</u>	<u>SPECIFICATION / DOCUMENT</u>
Tensile / Elongation	ASTM D-1414 (Type I / O Rings) ASTM D-412 Type II
Compression Set	ASTM D-395 (Method B)
Hardness (Pencil)	ASTM D-2240, D3363
Volume Swell	ASTM D-471
Tear Resistance	ASTM D-624
Resistivity	ASTM D-257-O
Tape Adhesion/Cohesion	Fed. Std. 1418 (Method 6301)
Laminar Shear	ASTM D-790
Peel Strength/Cohesion	SAE AS 5172
Lap Shear	ASTM D-1002
Hardness	ASTM D-2240
Torque	MIL-S-22473
Pressure Rupture	MIL-S-85334
Laminar Shear	ASTM D-790
Alaska Tape Test	Fed Test Std. 141 (Method 6301_
Tabor Test	ASTM D1044
Bubble Point (in. H ₂ O)	MIL-F-8815, SAE/ARP 901
Wet Dielectric (uA)	SAE AS 4373

3. Metallic Property Tests

The metallic specimens were evaluated in terms of corrosion. Weight gain or loss and pitting were the primary methods of evaluation. Optical microscopic evaluation to 50X was performed to evaluate color changes and pit area and depth. Scanning electron microscopy was used to characterize pit morphology and analyze for elemental constituents using energy dispersive x-ray spectroscopy (EDS). If warranted, cross-sections of samples were prepared to thoroughly evaluate the corrosion mechanisms (i.e. intergranular, selective leaching and exfoliation). Comparisons were made between the control JP-8, JP-8 + 100 and JP-8 + 100 4x concentrations on the alloys evaluated during thermal exposure. Based on the results, mechanical testing was not warranted. Pitting evaluation and uniform corrosion (weight loss) were found to be the most reliable means for determining the effect of the additive on the alloys tested. Welded, brazed and soldered assemblies simulating standard manufacturing techniques were included in the tests. *This evaluation did not assess the effect of the JP-8 control fuel and its associated normal (exclusive of the thermal stability additive) additives on the alloys tested.* The evaluations were performed in accordance with standard industry practice including the following specifications.

<u>TEST</u>	<u>SPECIFICATION</u>
SCC	ASTM-945
Weight loss/gain	ASTM-483
Cleaning	ASTM G1
Pitting evaluation	ASTM G46

4. Material Physical Properties Test Methods and Descriptions

1. Tensile strength (psi) may be defined as the resistance of a material to a force tending to tear it apart. The lbs. per square inch force at maximum breaking strength is reported. All materials were tested on a power driven test machine at a grip separation rate of 20"/min. O-rings were tested using 1/2-inch spindle grips, sealants, and film materials were evaluated using die C specimens. ASTM D 412 was the specification used.
2. % Elongation may be defined as a measure of growth in length of a material prior to breaking; reported as a percent of the original length. The elongation of all materials was measured using a video extensometer measuring gage marks on the specimen.
3. % Volume Swell may be defined as the amount a material swells when exposed to a fluid. % volume swell is the difference between the weight in air (w3) minus the weight in water (w4) after conditioning minus the difference between the wt in air (w1) minus the wt in water (w2) before conditioning divided by the difference between the weight in air minus the weight in water before aging times 100.

$$\frac{(w_3 - w_4) - (w_1 - w_2)}{(w_1 - w_2)} \times 100$$

4. Hardness: Shore A)- Hardness is the amount of force needed to cause a fixed amount of indentation with an elastomer. ASTM D 2240-97 is the specification method.

Pencil Hardness: A coating is scratched at a 45° angle with a pencil lead that is perfectly square. The hardness is the hardest lead that will not cut the coating. The procedure followed is in ASTM 3363.

5. Compression Set may be defined as the amount of elastic force remaining after a material has been compressed and then released. Cut o-rings are placed between two chrome-plated plates and compressed to 75% of their original thickness. After conditioning the o-rings are released and re-measured after setting out for 30 minutes ASTM-D-1414 is the procedure followed:

original thickness - t_o
final thickness - t_i
space bar thickness - t_n

$$C_s = \frac{(t_o - t_i)}{(t_o - t_n)} \times 100$$

6. Lap Shear: the force required to slide a bond apart. Two plates are bonded together, fluid immersed and then pulled apart in shear. 2024 T3 aluminum 1" wide with 1/2 inch overlaps were used to evaluate the adhesives. The specimens were pulled apart at a .05 inch crosshead speed.
7. Cohesion (%): Cohesion is the measure of the materials ability to adhere to a given substrate. The higher the % cohesive failure, the better the material adhered to the substrate with 100% cohesive failures being perfect. One hundred percent cohesion means that the bond of the adhesive or sealant to the panels is stronger than its own internal strength. This is used for the evaluation of adhesives and fuel tank sealants.

8. Peel strength (lb/inch): a measure of the adhesive strength of a sealant. Fuel tank sealants are laid on a solid substrate with a flexible member imbedded in the sealant. The flexible member is then pulled at a 180-degree angle to evaluate the load necessary to tear the sealant.
9. Laminar Shear: the shear force required to break a composite. Flexure loading of a composite material in four-point loading at a test speed of .05 inches/min. The procedure followed is ASTM-D-2344-84.
10. Resistivity: The resistance to electrical current was measured by placing a 1 inch thick by 12 inch diameter foam specimen between two electrodes. The megohmmeter (the instrument for measuring resistance) was set to 500 volts and the resistance was measured.

$$ev = \frac{\text{measured resistance} \times 155.7 \text{ cms}^2}{\text{sample thickness} \times 2.54 \text{ cm/in.}}$$

11. Torque: The amount of force needed to break the bond between a bolt and nut that were bonded together with Locktite.
12. Wet Dielectric is a measure of electrical conductivity. Wires are soaked in a 5% NaCl in water solution for one minute at 1500 VRMS AC 60 Hz using Hi potronics HD 125 high-pot tester.
13. Wet Adhesion describes the adhesion of a coating to a substrate. Two parallel lines were scribed 1 inch apart in the panels coated surface down to the metal. A piece of tape, 3M's 250 was laid across the lines and peeled at 180 degrees. The procedure followed is ASTM-D-3359.
14. Taber Abrasion: a measure of the wear resistance of a material. A wheel of known hardness and weight is laid on the surface of a coated panel. The panel is run in a circular pattern beneath the wheel for a number of cycles and the weight loss is calibrated.
15. Rupture Pressure is a measure of the resistance of a sealant to pressure. The sealing compound is packed in a hole on a blow out specimen, mounted in a pressure rupture fixture and air pressure is applied until the sealing compound fails. This test is run per MIL-P-85334.
16. Bubble point: This test method is a procedure for measuring the largest pore or hole in a fuel filter. The filter is immersed in a test liquid which wets and saturates the filter port structure. Gas pressure is applied to one side of the porous wall so that the liquid phase which wets the pores is displaced by the gas. The gas pressure is increased until a steady stream of bubbles is emitted from a point on the porous surface. This test is run IAW SAE ARP 901, and the reported measurement is in inches of water.
17. Ballistic Puncture Test for self sealing fuel bladder. A test was developed for evaluating the self-sealing bladder materials by comparing JP-8 fuel to TSA fuel test results. This test consisted of puncturing bladder (12" x 12") specimens by shooting them with a 50 caliber bullet. A 12" x 12" specimen was then placed into a permeability cup with the JP-8 fuel and a permeability cup with the TSA Betz fuel in normal concentration. A fuel seal of the puncture (no fuel leakage) without pressure was considered acceptable.

5. Fuel Property Tests

Several tests were conducted with the fuel before and after material thermal aging tests. Acid Number, Existent gum, hydroperoxides, conductivity and visual color were measured on the three fuels (JP-8 control, + 100 and +100 4x) after exposure to non-metallic materials. Fuel conductivity, color, and elemental analysis were measured on the test fuels and control fuel after subjected to thermal aging with metallic materials. Atomic absorption (graphite furnace) and inductively coupled plasma-atomic emission spectroscopy AA/ICP-AES proved to be of value in determining the concentration of metallic elements which may be extracted into the fuel by the fuel's chemical / corrosive attack on the metallic alloy. Specification guidance used in evaluating the fuel before and after thermal aging tests are as follows:

<u>TEST</u>	<u>SPECIFICATION / DOCUMENT</u>
Color	Visual Observation
Acid No.	ASTM D-3242 (Modified)
Gums	ASTM D-381
Hydroperoxides	ASTM D-3703 (See current revision using new voltametric method)
Conductivity *	ASTM D-2624 / D-4308
AA/ICP-AES	Used equipment manufacturers measurement techniques
Fuel Additives	ASTM D-4054 & ASTM D-2-1137

* Fuel conductivity measurements were obtained by using a digital conductivity meter Model 1152 Emcee Electronics Inc., Manufacturer All measurements were temperature corrected to 72°F IAW LOG10 KT2+LOG10KT1-8*10E-10(T1-72F). (See Figure # 3a)
KT2 = Fuel conductivity corrected to 72°F; KT1 = Fuel conductivity measurement;
T1 = Fuel temperature measurement

G. DATA COLLECTION

Standard laboratory practice was observed in all test activities and data collection. Care in maintaining the integrity of the fuels samples and materials samples included clean environment maintenance, careful handling practices and accurate identification and labeling. Test and measurement equipment was used in accordance with manufacturers directions and with appropriate standards and specifications. (See preceding Sections)

Tests were conducted and data collected in Room 145, a properly maintained and vented explosion proof laboratory room at Wright Laboratories in B-490 at WPAFB and laboratories at Kettering Laboratories on the University of Dayton Campus. In addition, Wright Laboratories facilities in B-70 and in B-462 at WPAFB were used in conducting fuel property tests. Test measurements and observations were recorded in all laboratories by qualified engineers and technicians.

Test activities and data collection were correlated among the test sites through identification of materials samples I.D. numbers, additives, fuel type, test and control fuels and test temperatures. Data collected in the laboratories was consolidated onto a single data sheet.

II. DATA PRESENTATION

Two formats were developed to record the consolidated thermal aging test results and evaluations of each individual material of this program. These formats contain both the material / fuel exposure results and the fuel / material exposure test results. The non-metallics format Figure #6 provides for the entry of all the material property test results, evaluation criteria and the evaluation of those results, as well as the fuel / material exposure control fuel general observations. The metallic format Figure #7 provides for the entry of all the material property test results and the evaluation of those results as well as the fuel / material exposure / control fuel and general observations.

The control fuel results are shown in order to illustrate the effects of thermal stress on fuel without the inclusion of a metallic or non-metallic fuel system material. The control fuel was not necessarily thermally stressed at the same time as the test fuel/material exposure. The two control fuels used were JP-8 (93-POSF-2980) or, later (June '95) in the test program, JP-8 (92-POSF-2926). The 92-POSF-2926 fuel resulted in higher degradation to some material properties as evidenced by comparing the post property test results with the 93-POSF-2980 results of the same materials. This evidence was particularly noted at a later date during the evaluation of a different thermal stability package. A test was conducted on three selected materials by reversing the control fuel and test fuels to determine the impact on the Betz test results. (See Table 2.) Although the results do depict a difference between the two fuels, they do not change the Betz TSA overall evaluations.

The test fuels were: *a)* JP-8 (93-POSF-2980) with thermal stability additive at a *normal* concentration (+100); and *b)* JP-8 (93-POSF-2980) with thermal stability additive at a *four times normal* concentration (+100 4x). **During the 1997 calendar year, 92-POSF-2926 was used exclusively as both the test fuel and the baseline fuel due to the depletion of 93-POSF-2980 fuel.**

TABLE 2.

RE-TEST RESULTS FOR JP-8 + 100 BETZ (TSA) ADDITIVE
AND
MATERIALS COMPATIBILITY COMPARISON OF 93-POSF-2980 VS.
92-POSF-2926

MATERIAL TEST I.D. TYPE TEST DATE	PHYSICAL PROPERTIES EVALUATED AT 28 DAYS 200° F	CONTROL AT ROOM TEMP. NO AGING	JP-8 FUEL (93 POSF) AGING 28 DAYS / 200 ° F					
			2980 JP-8	2926 JP-8	2980	2926	2980	2926
			NO ADD. (TSA)	NO ADD. (TSA)	BETZ	BETZ	BETZ X 4	BETZ X 4
I.A.2 ADHESIVE VINYL PHENOLIC 9/26/96	LAP SHEAR (PSI)	3755	3771/ 2932 *	4000 *	2982	3575 *	3188	3526 *
	COHESIVE (%)	100	100/ 100	100 *	100	100 *	100	100 *
I.A.5 ADHESIVE EPON DETA UN. MOD. EPOXY 9/27/96	LAP SHEAR (PSI)	4294	3879/ * 3659	3585 *	3884	3702 *	3851	3693 *
	COHESIVE (%)	100	100/ * 100	100 *	100	100 *	100	100 *
I.F.5 ESM FOAM CONDUCTIVE CLASS I. MIL-F- 87260 10/3/96	TENSILE * (PSI)	14/ * 15	9/ * 11	9 *	11	8 *	11	8 *
	ELONGATION (%)	146/ * 118	92/ * 87	89 *	92	90 *	85	96 *
	RESISTIVITY (PS/M)	5.52E+11/ * 1.29E+11	2.45E+12* 3.92E+11	2.45E+12*	3.98E+11	2.21E+12*	3.06E+11	2.45E+12*

• RE--TEST/NEW DATA

Table 3.

T E S T E V A L U A T I O N C R I T E R I A			
<i>Material Identity</i>		<i>Test</i>	<i>Criteria</i>
I.A.	Adhesives	Lap Shear Cohesion	30% Decrease 100% Minimum Value
I.B.1	Bladder (Innerliner)	Tensile Elongation Volume Swell	20% or 50% Decrease (Depending on Type of Construction) 35% Decrease 12% Maximum Value
I.B.11,13,14	Bladder (Nylon)	Tensile Elongation	20% Decrease 35% Decrease
I.B.15,16	Bladder (Self-Sealing)	Leakage	0 at Ambient Pressure
I.C.	Coatings	Hardness (Pencil) Tape Adhesion	0 Point Decrease Pass Minimum Value
I.D.1-9	Sealants (curing)	Tensile Elongation Volume Swell Hardness (Shore A) Cohesion Peel Strength	200 psi Minimum Value 150% Minimum Value 8% Maximum Value 30 Points Min. Value 100 % Minimum Value 20 lb./in. Minimum Value (200°F)
I.D.6	Sealant (Non-Curing)	Peel Strength	12 lb./in. Minimum Value (160°F)
I.D.10,11	Sealants (non-curing)	Volume Swell Rupture Pressure	8% Maximum Value 3.5 inch Hg Minimum Value
I.E.1-3	Composite	Laminar Shear	20% Decrease
I.F.1.1&2.	Filters	Bubble Point	3.3 inch H ₂ O Min. Value
I.F.2	Filters	Bubble Point	4.2" H ₂ O Minimum Value
I.F.3., 4., 9.	Foam (ESM)	Tensile Elongation	45% Decrease 40% Decrease
I.F.5 & 6	Foam (ESM, Conductive)	Tensile Elongation Resistivity (Ohm-cm)	45% Decrease 40% Decrease 1.0E12 Ohm-cm Maximum Value

Table 3. (Cont'd)

I.G.1.,2.,3., Gaskets “O” Rings 4.,9. (Nitrile)	Tensile Elongation Volume Swell Hardness (Shore A) Compression Set	25% Decrease 25% Decrease 0 % Minimum & 25% Maximum 5 pts (Decrease) & 5 pts (Increase) 50% Maximum
I.G.5.,10., Gaskets “O” Rings, Fluorosilicone		
II.G.1.,2.,5.,7.,13.,14.,15	Tensile Elongation Volume Swell Hardness (Shore A) Compression Set	45% Decrease 35% Decrease 0 % Minimum & 25% Maximum 20 pts Decrease 30% Maximum
I.G.6.,7., Gaskets, “O” Rings Fluorocarbon		
II.G.3.,6.,9.,12.	Tensile Elongation Volume Swell Hardness (Shore A) Compression Set	20% Decrease 20% Decrease 0% Minimum & 10% Maximum 5 pts Decrease & 5 pts Increase 60% Maximum
I.,G,8 Gaskets, “O” Rings, Perfluorocarbon		
II.G.4.,8.	Tensile Elongation Volume Swell Hardness (Shore A) Compression Set	20% Decrease 15% Decrease 0% Minimum & 5% Maximum 5 pts Decrease & 5 pts Increase 60% Maximum
I.H.2 Hoses	Tensile Elongation Volume Swell Hardness (Shore A)	20% Decrease 30% Decrease 8% Maximum Value 12 pts Decrease & 12 pts Increase
I.I.1 Teflon	Tensile Elongation	20% Decrease 30% Decrease
I.I.2.-4. Nylon & Polyethylene & Kapton	Tensile Elongation	20% Decrease 10% Decrease
I.I.6. Vinyl Plastic	Tensile Elongation	15% Decrease 15% Decrease
I.I.7. Kynar	Volume Swell Hardness (Shore A)	N/A 90 pts. (Control Material)
I.I.12.,13. Teflon, Nylon, Kapton, Composite (Wire Insulation)	Wet Dielectric	< 300 uA (Control Material)
I.I.13.1 Nylon Wire Coax Ctr.	Hardness (Shore A)	<400 uA (control material)
I.K.1.1.,2.,3.,I.K.4.,I.K.7, I.K.8.1.,2 Miscellaneous Materials	Visual Observations	Softness, discoloration, etc.
I.K.12 Fuel Qt Gaging, Probe Coating	Hardness (Shore A) Hardness (Shore B)	0 % Decrease 0 % Decrease

Table 3. (Cont'd)

I.L.1. Thread Lock	Torque	15 inch lb. (Control)
I.L.2. Thread Lock	Torque	34 inch. lb. (Control)
I.L.3. Thread Lock	Torque	13 inch lb. (Control)
I.O.1.-8 Floats	Visual	Float Fuel Level Before/ After Thermal Stress
I.P.1. Potting Compound, Epoxy	Lap Shear Cohesion	15 psi Dec 100 Minimum Value
I.P.2.1 Polysulfide	Tensile Elongation Volume Swell Hardness Shore (A) Cohesion Peel Strength	20% Decrease 20% Decrease -10% Minimum Value 10 pts Dec. & 10 pts Inc. 100% Minimum Value 20 lb./inch
I.P.2.2.1.1 Potting Compounds	Visual Observation	Shrinkage from Conductors

III. TEST RESULTS

A summary of the test results of the materials subjected to thermal aging in the additive test fuels and in the control JP-8 fuel is presented in the summary table, Section VIII. Each material shown is presented in this table at the temperature(s) to which it was tested. The overall test result / evaluation of this summary table was taken from each materials individual data sheet as presented in Section IX. of this report. The “W” symbol indicates a material test result which was within the allowable requirements set forth. An “O” symbol indicates a material test result which was outside the allowable requirement. The “OT” symbol indicates that a material was tested to a temperature beyond its limits i.e. to a temperature higher than the material was designed to (or would be expected to) tolerate. An “I” indicates that a test still is planned but has not yet been conducted. The “NT” indicates no test is planned. The use of the symbol “CN” indicates control (JP-8 fuel/material) and is primarily associated with metallics comparison evaluations.

The *metallic* materials evaluation directly compares the results obtained when materials were subjected to the JP-8 test fuels (JP-8 +100 and JP-8 +100 4x) to the results obtained when materials were subjected to the JP-8 control fuel. In contrast to the metallics evaluation, the non-metallics evaluation includes a second screening criteria in which the thermally stressed materials were directly compared to the unaged control (new) material allowable tolerance requirement. If the test results with test fuels (JP-8 + 100 in normal concentrations and in 4x concentrations) are below the test results with JP-8 / material / thermally stressed fuel, but within the material allowable tolerance requirement, the test fuel (additive) is considered to be compatible with the test materials.

Materials are reported in the following test results sections as having **“passed”** when they are assigned a **“W”** (within allowable requirement) for *all* material property tests in the data collection format.

Materials are reported as having **“failed”** when they were rated with an **“O”** (outside allowable requirement) in *any* material property test in the data collection format. A material that is reported as having failed may actually have had acceptable (“W”, within allowable requirement) results in one or more of the tests. A material has failed in the context of this report when it has failed to meet the allowable requirement in *any one* test.

Materials are reported as having **“failed”** when they were rated with an **“OT”** (material tested beyond temperature range) even though the material would not have been expected to tolerate the test temperatures.

The Betz additive package was judged acceptable primarily based on its comparison to JP-8 (control) fuel.

Section IX of this report contains the complete database for all the materials’ individual physical property test results / evaluations for a given temperature and the thermal aging test period(s) 28 and 7 days for selected materials. This section has all the data results / evaluation for each of the approximately 295 tests and 222 materials involved in this evaluation.

Discussion of Test Results

I.A. Adhesives

I.A.3 This adhesive, I.A.3., Nitrile Mod Epoxy, failed cohesion at 200°F but passed at 160°F in JP-8 and Betz fuels. The 200°F temperature was considered an over temperature for this material.

I.A.9 This adhesive, I.A.9. failed in JP-8 control fuel but passed in the fuel with Betz additive (JP-8 +100) and (JP-8 +100 4x) indicating that the +100 additive retarded degradation.

I.A.10, an acrylic adhesive, I.A.10., failed in both JP-8 and the test fuels, +100 and +100 4x. This material is not resistant to fuel and should not be used in contact with fuel.

I.B. Bladders

Several of the **bladder innerliners failed at 200° F**. Those materials failing due to *over-temperature* in the JP-8 control fuel at 200°F included: I.B.1 Nitrile, I.B.2, Nitrile; I.B.4 Nitrile; I.B.5 Polyurethane (also failed at 160°F in test fuel); I.B.7 Nitrile; and I.B.8 Urethane. (These latter two materials were old and had been stored in cabinets for 15 years.) I.B.4, I.B.5 and I.B.7 also failed in the test fuels at 200°F. Of those failures, the results in fuel with Betz at normal concentrations and higher concentrations (JP-8 +100 4x) showed improvement over or near equivalence to the JP-8 fuel except I.B.5. The I.B.5 Polyurethane innerliner materials failed volume swell at both 200°F and 160°F in Betz fuels; however, this high swell characteristic did not adversely weaken its tensile and elongation characteristics and is therefore considered satisfactory. The results of these tests have been provided to the manufacturers for their evaluation and consideration. ***The remaining innerliners passed at 200°F in JP-8 and Betz fuels.*** I.B.4 was retested successfully at 160°F in JP-8 and Betz fuels.

I.B.11 Nylon, I.B.12, Polyester I.B.13, I.B.14 Nylon Structural Bladder Cell Cloth

These materials **passed** at **200°F** in both the control fuel and fuels with Betz additive. (Except I.B.13)

I.B.13 Polyester cloth failed the Elongation test at 200°F in JP-8 and Betz fuels. However, the results in test fuels were better than results in JP-8 fuel.

I.B.15, I.B.16 Self Sealing Bladder Materials

These materials sealed after ballistically shot when subject to JP-8 and Betz fuel. (Normal concentration only)

I.C. Coatings

All of the **Coating** (I.C.1.,2.,3.,4.,5.) **materials passed** at **200°F** in fuels with **Betz** additives at normal concentration (**JP-8 +100**) and at higher concentration (**JP-8 +100 4x**). *I.C.1 Nitrile failed tape adhesion in JP-8 control fuel.* I.C.6 Epoxy-Polyamide on A-36 plate steel at 120 °F passed in JP-8 and Betz fuels.

I.D. Sealants

Most of the **Sealants** (I.D.) **passed at 200°F** in **JP-8 and Betz fuels** with the *exception of two Polysulfides I.D.8 and I.D.9 which were re-tested at 160°F and passed*. I.D.8 and I.D.9 failed cohesion (94%) in 4x Betz at 160°F but passed cohesion (100%) at 200°F. This slightly out-of-tolerance condition is considered to be caused by improper material test specimen preparation prior to the 160°F test.

I.E. Composites

All of the **Composites** (I.E.) tested **passed at 200°F** in **JP-8 and Betz fuels**.

I.F.1.1,2, I.F.2 Fuel Filters

All three fuel filters passed at 250°F (I.F.1.1, I.F.1.2, I.F.2) in JP-8 and Betz fuels.

I.F. Foams (ESM)

The **Foams**, I.F.3, I.F.4, I.F.5 I.F.6 (explosion suppression materials) all **passed at 200°F** in **JP-8 and Betz fuels**.

I.F.9 passed at 160°F. (Note: Aircraft application and foam manufacturer of this material are unknown.)

I.G./II.G. Gaskets

Because of the many types of **Gaskets/"O" Rings**, different use criteria required that they be tested at various temperatures. They are discussed individually below:

I.G.1 and I.G.2 Nitriles

These **"O" Rings** are for use in *hydraulic fluids* and *are not fuel resistant*. They **failed** at both at **200°F** and at **160°F** in **JP-8 and Betz fuels**.

I.G.3 Nitrile (MIL-P-5315)

This **"O" Ring** material *is fuel resistant*, but **failed** at **325°F**, at **200°F**, and at **180°F**. It **passed** at **160°F** in **fuels with Betz additives**, but the material **failed** tensile and elongation at **160°F** in **JP-8 control fuel**.

I.G.4 Nitrile (AMS 7271)

This **"O" Ring** material *is fuel resistant* but **failed tensile**, volume swell and hardness in JP-8 and Betz fuels at **200°F**, although it **passed at 160°F** in **JP-8 and Betz fuels**.

I.G.5., 6., 7., 8, 10, 11, 12, 13. See results under II.G.2, II.G.6, II.G.3, II.G.4, II.G.1, II.G.10, II.G.11 below

I.G.9 Nitrile

This **"O" Ring** material failed *hardness* at **160°F** with JP-8 and Betz fuels; however, the test results in fuels with Betz additives (both concentration levels) were equal to or improved over JP-8 control fuel. The material also failed at **200°F** in JP-8 and Betz fuels; nevertheless, *significant improvements* in test results were noted with the materials in the fuels with **Betz and Betz 4x** additives over results in the JP-8 control fuel.

I.G.13 Cork

This **Cork** material (used for gaskets and floats) **passed at 200°F** in JP-8 and Betz fuels.

II.G.1/I.G.10 Fluorosilicone

This “O” Ring material **failed** tensile, elongation and compression set at **325°F** and tensile, elongation and volume swell at **275°F in JP-8 and Betz fuels**. It was not tested at 200°F with any fuel.

II.G.2/I.G.5 Fluorosilicone

This “O” Ring material **failed** tensile, elongation, volume swell, hardness, compression set at **325°F** with JP-8 and Betz fuels. At **250°F**, it failed tensile and hardness in **JP-8** control fuel. However, it **passed** at **200°F** in JP-8 and Betz fuels.

II.G.3/I.G.7 Fluorocarbon (Low Temperature Material)

This “O” Ring material **passed** all tests at **400 °F, 325 °F and at 200°F in both test fuels**. The JP-8 fuel at 325 °F and 400 °F results were only slightly out of the tensile tolerance requirement.

II.G.4/I.G.8 Perfluoroelastomer

This “O” Ring material passed all tests at **325°F in JP-8 and Betz fuels**. This material passed all tests at **200°F in JP-8 and Betz fuels**.

II.G.5 Fluorosilicone

This “O” Ring material **failed** tensile and hardness at **325°F** and all tests at **275°F** in JP-8 and Betz fuels.

II.G.6 Fluorocarbon, (Low Temperature Material)

This “O” Ring material **passed** all tests at **325°F** but failed tensile at **400°F in JP-8 and Betz fuels**. However, the Betz and Betz 4x tensile results were improved over the JP-8 fuel test results at 400°F.

II.G.7 Fluorosilicone

This “O” ring material **failed** tensile and compression set at **325°F in JP-8 and Betz fuels**. However, the test fuels were approximately equal or were better than the JP-8 fuel test results

II.G.8 Perfluoroelastomer

This “O” ring material **failed** compression set at **325°F in JP-8 and Betz fuels**. Test fuels were approximately equal to or were better than the JP-8 fuel test results.

II.G.9/I.G.6 Fluorocarbon

This “O” Ring material **passed** at **200°F in JP-8 and Betz fuels**. The *tensile strength test failure* of this material at *325°F* in the fuels with normal concentration of *Betz additive* was *equal to its failure in JP-8 control fuel*. The 4x concentration of Betz TSA was slightly worse than the JP-8 control fuel.

II.G.10/I.G.11 Urethane, Pump Washer

This Gasket material **failed** at **325°F**, and at **200°F**, but it **passed** at **160°F in JP-8 and Betz fuels**. The **325°F**, and **200°F** failures were considered over-temperature.

II.G.11/I.G.12 **Plastic, Pump**

This material **passed at 200°F in JP-8 and Betz fuels** but **failed at 325°F**. **The failure was considered an over-temperature at 325 °F**

II.G.12 **Fluorocarbon, Improved (Low Temperature Material)**

This “O” Ring material **passed at 325°F** and at **400°F** in **JP-8 and Betz fuels**. *No compression set data was recorded at either temperature.*

II.G.13 **Fluorosilicone, Improved**

This “O” Ring material **failed** tensile, elongation, volume swell, compression set at **325°F in JP-8 and Betz fuels**; however, the material **passed at 200°F in JP-8 and Betz fuels**.

II.G.14 **Fluorosilicone, Fluorosilicone with Teflon**

This “O” Ring material **passed at 180°F in JP-8 and Betz fuels**. It was not tested at 200°F or 325°F.

II.G.15 **Fluorosilicone, Fluorosilicone with Teflon**

This “O” Ring material **passed at 200°F in JP-8 and Betz fuels**.

I.H.2 through I.H.5 **Hoses**

I.H.2, I.H.3, and I.H.4 **Hose Innerliner** materials **failed** tensile, elongation and hardness at **200° F** in JP-8 and Betz fuels. The temperature, **200 °F, is beyond the expected service use of these materials**. The material was re-tested in **JP-8 fuel** at **160° F** and **passed**. Based on the results of this re-test, the Betz and Betz(4) test results which were equal to or exceeded JP-8 results at **200° F** also are considered to be satisfactory at 160°F. I.H.5 passed in the test fuels at 200° F but failed tensile and elongation in JP-8.

I.I.1-9 **Wire Insulation**

I.I.1 **Teflon (TFE)**

This material **passed at 200°F in JP-8 and Betz fuels**.

I.I.2 **Nylon (Zytel 101) (Old material, beyond reasonable shelf life)**

This material **failed** elongation in JP-8 but test fuels exceeded JP-8 tests results at **160°F**. The test fuels exceeded JP-8 elongation results. At **200°F**, the material failed elongation in JP-8 and Betz fuels.

I.I.2 **Nylon (New material)**

This new material **failed** tensile and elongation at **200°F** in JP-8 but passed tensile in the Betz and Betz 4x test fuels. The test fuels exceeded JP-8 elongation results.

I.I.3 **Polyethylene Film**

This material **failed** tensile at **200°F in JP-8 and Betz fuels**. However, the test fuels material results were equivalent to the JP-8 test results.

I.I.4 Kapton/Upilex

This material **passed** at **200°F** in **JP-8** and **Betz fuels**.

I.I.5 Marmon Clamp

No test is planned for this material. The parts materials could not be identified.

I.I.6. Vinyl Plastic

This material **failed** at **200°F** in JP-8 and Betz fuels and **failed** in JP-8 at **160°F**.
No tests were conducted with the test fuels at 160°F

I.I.7 Kynar

This material passed at **200°F** in **both test fuels**.

I.I.9 Magnetic Wire Insulation Type I

This material passed at **325°F** in **both test fuels**.

I.I.10 Teflon/Kapton (Composite) Wire/Insulation

This material passed at **200°F** - in **JP-8** and **Betz fuels**.

I.I.11 Shrink Wrap

No test planned.

I.I.12, 13, 13.1 Teflon, Nylon Wire Insulation and Coax Shield

These materials all passed in JP-8 and Betz fuels at 200°F

I.J. 1 - 16 Joining Materials (Brazing and Welding)

The materials I.J.2 through I.J.10, I.J. 13 and I.J.14 all passed at **325°F** in **both test fuels** (those fuels containing Betz additives in normal and 4x concentrations). The I.J.11 tin and lead solder spots **failed** at **325°F** in the **Betz fuels**. This material was tested beyond its temperature limits and was **successfully re-tested** at **200°F**. The **I.J.1, I.J.12, I.J.15 and I.J.16** all passed at **200°F** in **both test fuels**.

I.K. .1 - .12 Miscellaneous Materials, Identification Plates and Assemblies

I.K.1.1, I.K.1.2, I.K.1.3 Ink Stamp Top Coatings

These identification marking tag materials **passed** at **200°F** in JP-8 and Betz fuels.

I.K.2., 3., 5., 6a., 6b., 6c. 8.1., I.K.9, I.K.10 1 & 2, I.K. 11. 1 & 2

These materials and assemblies have not been tested. The assemblies I.K.10.1 through I.K.11.2 are planned to be tested in a follow-on program. No tests are planned for the remaining materials/protective coatings.

I.K.4 Name Plate

This identification plate **passed** at **200°F** in JP-8 and Betz fuels.

I.K.7 Carbon Bearing

This bearing material **passed** at **200°F** in JP-8 and Betz fuels.

I.K.8.2, I.K.8.3 **Carbon Bearing**

These two bearing materials **passed at 325°F** with JP-8 and Betz fuels.

I.K.12 Polyphenylene Sulfide

This material **passed at 200°F** with JP-8 and Betz fuels.

I.L. 1 - 4 **Locking Devices**

These three materials **passed at 200°F** with JP-8 and Betz fuels.

I.M.1 through I.M.43 **Metallics**

I.M.1 through I.M.20, 23, 24, 25, 26.A, 26.B., 27, 28, 30 through 33, 36, 39, 41, 42

All **passed at 200°F** with both test fuels.

I.M.1, 3, 7, 9, 21, 22, 23, 25, 27, 28, 30, 31, 32, 34, 35, 37, 38, 40, 43

All **passed at 325°F** with both test fuels.

I.M.2, 4, 5, 6, 8

All **failed at 325°F** due to testing beyond the materials temperature range in JP-8 and Betz fuels, but were **tested successfully at 200°F**.

I.M.29

This material **failed** at both **325°F** and **200°F** but **tested successfully at 160°F** with both test fuels.

II.M.1 through II.M.41 **Metallics**

II.M.1 through II.M.41

All **passed at 325°F** with both test fuels except II.M.31, II.M.38 and II.M.39 which were not tested.

II.M.2., 3, 4, 5, 6, 9, 21, 22, 23.1, 23.2, 25

All **passed at 200°F** with both test fuels.

II.M.2 and II.M.23.4 **passed at 400°F** with both test fuels

I.O.1 through I.O.8 **Floats**

I.O.1 through I.O.7 float materials **passed at 225°F** in both test fuels. I. O. 8 cork material **passed at 200°F** with both test fuels.

I.P. **Potting Compounds**

I.P.1 **Epon Epoxy**

This material **passed at 200°F** with JP-8 and Betz fuels.

I.P.2.1, & 2.2 Polysulfide Potting Compound

I.P.2.1 Polysulfide Slab

Polysulfide slab **failed** at **200°F** with JP-8 and both test fuels.

I.P.2.2 Polysulfide Electrical Connector Application

This material **failed** in this application at **200°F** due to **high material shrinkage** around wire conductors, insulation with JP-8 and both test fuels. (See Figure #8.)

Summary and Test Results for 7 day material tests are shown in VIII and IX report sections herein for the following materials:

I.B.4., I.B.5., I.C.2., I.D.2., I E.1., I.E.2., I.F.3., I.F.4., I.F.5., I.G.2., I.G.6., II.G.2.,3,7.

I.G. and II.G. “O” rings 7 day aging test results were similar to 28 day aging property test results, indicating most material deterioration occurs within 7 days.

Elemental Analysis of Fuel

Elemental analysis (graphite furnace AA/ICP-AES) tests were conducted to determine whether elements were leaching from the metallic test specimens into the JP-8 control fuel and into fuels containing thermal stability additives (+100 and +100 4x). Early testing indicated that elemental analysis detected, in some cases, only a small amount of a given element in JP-8 control fuel but a higher amount in JP-8 +100 and an even higher amount in the fuel having +100 4x concentration of additive. It was later determined that the results in these tests had been affected by improper sample preparation. It was noted that the elements had been held in suspension in the fuels with +100 and +100 4x as a result of the additive’s detergent/dispersant qualities. The elements had been settling to the bottom of the test beakers in the JP-8 control fuel and that fuel discarded. In addition, the fuel had not been mixed before test samples were taken which resulted in improper readings. Improved mixing of all sediments before graphite furnace / ICP measurements were taken for elements resulted in more accurate readings. Subsequent readings found no significant differences between elements detected in JP-8, JP-8 +100 and JP-8 +100 4x with fuel samples taken from the II.M.23 leaded bronze tap MS285.

Early testing did not test most metallic materials for elemental analysis. Elemental analysis data contained in this report may not reflect proper mixing techniques since re-test of all the many materials would have been prohibitive. However, all metallic materials with JP-8 and Betz fuels (JP-8, TSA and TSA 4x) were subject to microscopic evaluations.

IV. CONCLUSIONS

- A. On the basis of a direct comparative evaluation with JP-8 and new material allowance tolerances for the materials tested and evaluated, the **Betz/Dearborn SpecAid® 8Q462 thermal stability fuel additive is compatible with the materials found in Air Force aircraft fuel tanks, systems and engines and ground support equipment.**
- B. The **Betz/Dearborn SpecAid® 8Q462** thermal stability fuel additive actually **lessens the fuel degradation of many non-metallic materials.** In addition the **Betz/Dearborn SpecAid® 8Q462 thermal stability fuel additive generally results in cleaner metallics.**
- C. A fuel selected to be used for a particular fuel additive should also be used as the JP-8 control (comparative) fuel. Since different fuels may have significantly different oxidation characteristics, care should be taken to always compare the results of test using the same control fuel. Also, the control fuel/material aging containers should be placed in the same oven under the same conditions and at the same date and period of time to which the test (additized) fuel is subjected.
- D. Materials Below/Outside Criteria with Betz TSA Fuel:
 - 1. Materials in which the test results were below JP-8 control test results and outside the new material tolerance allowance are listed below: These material results although outside the established evaluation criteria, are considered acceptable for aircraft fuel system use for the following reasons:
 - a. I.B.5 Bladder Tank Innerliner, Polyurethane, 160°F and 200°F. This polyurethane material had volume swell characteristics with JP-8, TSA and TSA 4x concentrations at both 160°F and 200°F of --/17%, 23/28% and 17/29% respectively, which are outside the allowable tolerance criteria requirement of 12 %. This I.B.5 Polyurethane innerliner material failed volume swell at both 200°F and 160°F. However, the I.B.5 Polyurethane high swell characteristics did not adversely weaken its tensile and elongation characteristics and therefore this material is considered acceptable for use with the Betz additive.
 - b. I.B.8 Bladder Tank Innerliner, Polyurethane, 200°F. This polyurethane material had volume swell characteristics with JP-8 at 200°F of 13% which is just slightly outside the allowable tolerance criteria requirement of 12% and is thereby considered satisfactory.
 - c. I.D.8 PR-1776, Polysulfide, AMS3281. This material cohesive properties after 28 days of aging at 160°F with 4x additive were 94% and outside of the acceptable tolerance allowance of 100% cohesion. However, at 200°F after 28 days, the same material had 100 % cohesive properties in the 4x test fuel. This cohesive failure was likely due to improper specimen preparation and is therefore considered acceptable with the 4x test fuel.

- d. I.I.3 Polyethylene (HDP). The acceptable tolerance requirement for the tensile test for this material is 20%. The tensile test result for JP-8 fuel was 32%; the tensile test result for the TSA fuel also was 32%. The result for the 4x concentration of TSA was 33%. The TSA did not degrade the material more than JP-8 and is therefore acceptable.
- E. Numerous materials were determined to have fuel system use limitations and prohibitions.
1. Unsuitable Materials for use in any Aircraft Fuel System. Materials unsuitable for aircraft use in frequent and/or continuous contact with JP-8 fuel or TSA fuel with physical properties significantly outside acceptable tolerance requirements:
 - a. I.A.10 Adhesive Acrylic
 - b. I.G.1 Hydraulic Nitrile (“O” Ring Applications)
 - c. I.G.2 Hydraulic Nitrile (“O” Ring Applications)
 - d. I.I.6 Vinyl Plastic
 - e. I.P.2.1,2.2 Potting Compound, Polysulfide, MIL-S-8516
 2. Material Over Temperature. These materials are considered to be thermally aged to a temperature beyond their physical limits. Use of these materials over the specified temperature may result in system application failure.

Non-Metallics

- a. I.A.3, 2 Nitrile Mod. Epoxy at Temperatures
- b. over 160°F in JP-8 & Betz fuels.
- c. I.B.1., Nitrile Bladder Innerliner; I.B.2, Nitrile Bladder Innerliner; in JP-8 and Betz fuels at temperatures higher than 160°F.
- d. I.B.4 and I.B.5 Nitrile bladder innerliner at temperatures higher than 160°F in JP-8 and Betz fuels.
- e. I.B.7, Nitrile at temperatures over 160°F in JP-8 and Betz fuels
- f. I.B.8, Urethane, Bladder Innerliner at temperatures over 200°F in JP-8 and Betz fuels.
- g. I.B.13, Nylon Cloth at temperatures over 160°F in JP-8 and Betz fuels.
- h. I.C.1, Nitrile, Coating, at temperatures above 160°F in JP-8 fuel
- i. I.D.8, Polysulfide, Sealant; I.D.9, Polysulfide Sealant, at temperatures above 160°F in JP-8 & Betz fuel
- j. I.G.3, Nitrile, MIL-P-5313, I.G.4 Nitrile (AMS 7271) and I.G.9 “O” Ring at temperatures over 160°F
- k. II.G.1., II.G.2., II.G.5., II.G.13., Fluorosilicones, (MIL-R-25988) “O” Ring at temperatures over 225°F in JP-8 and Betz fuels. (See V. Recommendation, B.1.)

- l. II.G.6, Fluorocarbon, MIL-R-83485 at temperatures over 325°F in JP-8 and Betz fuel.
- m. II.G.7, Fluorosilicone “O” Ring at temperatures over 225°F in JP-8 & Betz fuels. (See V. Recommendation, B.1.)
- n. II.G.8, Perfluoroelastomer “O” Ring, at temperatures of 325°F and over in JP-8 and Betz (Note high compression set value.)
- o. II.G.9, Fluorocarbon “O” Ring, at temperatures of 325°F in JP-8 & Betz fuels
- p. II.G.10./I.G.11. Urethane (PO-652) over 160°F in JP-8 and Betz fuels
- q. II.G.11/I.G.12 Urethane (JT-90) over 200°F in JP-8 and Betz fuels
- r. I.H.2, Nitrile/Acrylic, Hose, Aerial Refueling MIL-H-4495 at temperatures over 160°F in JP-8 and Betz fuels
- s. I.H.3, Nitrile, Ground Refueling hose at temperatures over 160°F in JP-8 and Betz fuels.
- t. I.H.4, Nitrile, Ground Refueling Hose at temperatures over 160°F in JP-8 & Betz
- u. I.H.5, Epichlorhydrin Ground Refueling Hose, at temperatures over 160°F JP-8 fuel (satisfactory with +100/4x Betz up to 200°F)
- v. I.I.2, Nylon 101 Film, at temperatures over 160°F
- w. I.I.3, Polyethylene, Film, at temperatures over 160°F in JP-8 and Betz

Metallics

- a. I.J.11,B36-21A Copper/Tin/Lead solder sponts over 200 °F in JP-8 and Betz fuel.
 - b. I.M.2, Aluminum 6061-T4 Bare, at temperatures over 200°F in JP-8 and Betz fuel
 - c. I.M.4, Aluminum 7075-T6 Chromic Acid Anodize, at temperatures over 200°F in JP-8 and Betz fuel
 - d. I.M.5, Aluminum 7075-T6 Alodine, at temperatures over 200°F in JP-8 and Betz fuel
 - e. I.M.6, Aluminum 7075-T6 Bare, at temperatures over 200°F in JP-8 and Betz fuel
 - f. I.M.8, Aluminum 2219-T87 Bare, at temperatures over 200°F in JP-8 and Betz fuel
 - g. I.M.29, Barium Ferrite, at temperatures over 160°F in JP-8 and Betz fuel
- F. Test results did not indicate the Betz in normal or 4x concentrations to be any worse than the JP-8 fuel in adding ions to the fuel such as copper and lead, i.e., leaded bronze II.M.23 from metallic materials.
- G. Fuel aging properties of “O” rings tested for 28 days versus 7 days were similar.

V. RECOMMENDATIONS AND SHORT MATERIALS LISTING

(for Frequent and/or Continuous Contact with Fuel Wetted Parts of Fuel Systems)

- A. *Betz additive as related to fuel system materials compatibility be approved for use with USAF aircraft.*
- B. *Recommend not using materials in fuel systems at temperatures beyond their temperature range without a more extensive test evaluation program.*
 - 1. *Recommend Fluorosilicone “O” rings not be used at temperatures above approximately 225°F. (See AFRL Report AFRL-PR-WP-TR-2017)*
 - 2. *Recommend fluorocarbon “O” rings only be used at temperatures of 325°F to 400°F provided compression set data has been carefully reviewed and considered for a given application.*
 - 3. *Recommend nitrile “O” rings not be used at temperatures above 160°F.*
 - 4. *Future aircraft development programs should carefully evaluate fuel tank bulk fuel and recirculation fuel temperatures and determine whether PR-1776 (I.D.8) is a suitable material to use at temperatures above 160°F.*
- C. *Recommend conducting new research and development programs to re-formulate bladder innerliner and hose innerliner materials that can meet 225°F minimum continuous operations temperature. These programs should be implemented to meet near future needs.*
- D. *Recommend component application re-test of certain materials i.e. “O” rings in JP-8 in which the static test results were outside acceptable limits. Attempt to establish a correlation between static test results (free state) with dynamic fuel flow application (constrained state) test results.*
- E. *Utilize a shorter materials list for future evaluations with additives with similar chemistry to the Betz. (See Material Short List, Pages 37/38 herein)*
- F. *Great care should be taken not to substitute nitrile hydraulic “O” rings for nitrile fuel “O” rings.*
- G. *Evaluate the effect water may have on thermal stability fuel additive compounds and resultant changes that could negatively affect material deterioration.*
- H. *Insure proper fuel and TSA mixing procedures and that all sediments of stressed fuel are included in fuel samples taken for elemental analysis (atomic absorption and ICP measurements.)*
- I. *Further fuel evaluation of metallic materials such as copper, lead, cadmium and zinc that come in continuous contact with JP-8 fuel and JP-8 fuel additives should be carefully considered in any follow-on dynamic (fuel flow) evaluations and service tests.*
- J. *The use of polysulfide MIL-S-8516 as a potting compound for electrical connections in contact with fuel is not recommended.*
- K. *The use of an acrylic adhesive as a fuel tank adhesive is not recommended.*
- L. *Vinyl plastic use in contact with fuel is not recommended.*
- M. *“O” rings fuel aging testing should be reduced from 28 days to 7 days.*

JP-8 +100 Materials Test List
Recommended Follow On Additive
Material Short List (Metallics)

	° F	MATERIAL	I.D. NO	I.D. NO
1.	200	7075 T-6 Bare	I.M.6	N/A
2.	325	C-356-T6	II.M.20	I.M.11
3.	325	304 S.S	II.M.12	I.M.15
4.	325	347 S.S.	II.M.8	I.M.18
5.	325	17-4 pH (100)	II.M.24	I.M.20
6.	200	CU / NI 90 / 10	I.M.26B	N/A
7.	325	LEAD AMS 4751	I.M.28	NA
8.	325	MONEL 400	II.M.27	I.M.34
9.	325	BRASS SHEET 268 (CU)//260	I.M.27	N/A
10.	325	4130 DENSIFIED, NEW SEALING, ION VAPOR DEPOSITION (IVD) SCRIBED	II.M.37	N/A
11.	200	AZ31-H24 AZ 91-T6 M	I.M.39	N/A
12.	325	718 INCO NICKEL	II.M.6	I.M.16
13.	325	440 S.S	II.M.11	I.M.17
14.	325	CPM 10-V	II.M.18	N/A
15.	325	135 MOD (NITRALLOY)	II.M.22	N/A
16.	325	TAP MS 285 (LEADED BRONZE) Polished Cy	II.M.23.2	N/A
17.	325	Ti-8Al-1Mo-1V	II.M.36	N/A
18.	325	SILVER PLATE A-286 TI PEAK AGED	II.M.21	N/A
19.	325	IN200 B, Ni 5 OR 6	I.J.8	N/A
20.	325	WASPALLOY Ni BRAZED AMS 4786 Ag	I.J.9	N/A
21.	200	QQ-571, SN 60 (TIN 60% / LEAD 40%) B3621A	I.J.11	N/A
22.	200	5052 H-34 WELDED 6061 T6 WITH 5356 FILLER	I.J.15	N/A
23.	325	4340 (280 KSI) AMS 6415	I.M.43	N/A
24.	325	303 STAINLESS	II.M.40	N/A
25.	325	TI-CP-70	II.M.41	N/A
26.	200	2024-T6	I.M.44	N/A
27.	325	MAG WIRE INSULATION TYPE I	I.I.9	N/A
28.	200	4130 CADMIUM PLATE (CLASS II) TYPE 2 Gold	I.M.23	N/A
29.	200	7075-T6 SULFURIC ACID ANODIZE THIN DENSITY	I.M.45	N/A
30.	200	7075-T6 ALODINE / 200 ALUMINUM	I.M.5	N/A
31.	200	2090 T8 AMS 4232 ALUMINUM	I.M.46	N/A

JP-8 +100 Materials Test List
Recommended Follow On Additive
Material Short List (Non-Metallics)

	° F	MATERIAL	I.D. NO
1.	160	ADHESIVE	I.A.2
2.	200	ADHESIVE (EPON)	I.A.5
3.	200	ADHESIVE	I.A.7
4.	160	BLADDER NITRILE	I.B.4
5.	200	BLADDER, POLYURETHANE	I.B.5
6.	200	COATING, MIL-S-4383 NITRILE	I.C.1
7.	200	COATING, MIL-C-27725, POLYURETHANE	I.C.2
8.	200	COATING (EPOXY)	I.C.3
9.	120	BULK TANK COATING (EPOXY) A-36 PLATE STEEL	I.C.6
10.	200	SEALANT MIL-S-8802 DICHROMATE	I.D.1
11.	200	SEALANT MANGANESE	I.D.2
12.	200	SEALANT (PRIMER) FLUROSILICONE	I.D.5
13.	200	SEALANT, POLYURETHANE	I.D.6
14.	200	SEALANT, POLYTHIOETHER	I.D.7
15.	160	SEALANT, POLYSULFIDE	I.D.8
16.	200	COMPOSITE AS4/3501-6, EPOXY GRAPHITE	I.E.1
17.	200	COMPOSITE IM7/52504-GRAPHITE BISMALIEMIDE	I.E.2
18.	200	COMPOSITE AS 7/8551 EPOXY GRAPHITE	I.E.3
19.	200	FOAM MIL-F-87260 POLYURETHANE	I.F.6
20.	160	GASKET MIL-P-5315 “O” RING NITRILE	I.G.3
21.	225	GASKET MIL-R-25988 “O” RING FLUROSILICONE	I.G.5
22.	325	GASKET, MIL-R-83248 “O” RING FLUROSILICONE	II.G.9
23.	400	GASKET MIL-R-83485 (B) FLUOROCARBON	II.G.6
24.	160	HOSE, AERIAL REFUELING ACRYLIC NITRILE	I.H.2
25.	160	HOSE, GROUND REFUELING EPICHLOROHYDRIN	I.H.5
26.	160	TEFLON (FILM)	I.I.1
27.	160	NYLON (FILM)	I.I.2
28.	160	POLYETHYLENE (FILM)	I.I.3
29.	200	KAPTON (FILM)	I.I.4
30.	200	KAPTON/TEFLON (COMPOSITE) WIRE	I.I.10

VI. REFERENCE DOCUMENTS

Non-Metallics

MIL-HDBK-149B	Military Standardization Hand Book Rubber
ASTM D-1414	Standard Test Methods for Rubber O-Rings
ASTM D-412	Type II Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers & Thermoplastic Elastomers - Tension
ASTM D-395	Method B Rubber Property - Compression Set
ASTM D-2240	Rubber Property - Durometer Hardness
ASTM D-471	Rubber Property - Effect of Liquids
ASTM D-624	Tear strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers
ASTM D-257	DC Resistance or Conductance of Insulating Material
ASTM D-790	Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
ASTM D-413	Rubber Property - Adhesion to Flexible Substrate
Fed Std 1418	(Method 6301) Measuring Adhesion by Tape Test
MIL-R-25988	Rubber, Fluorosilicone Elastomer Oil- and Fuel- Resistant Sheets Strips, Molded Parts and Extruded Shapes
MIL-R-83485	Rubber, Fluorosilicone Elastomer, Improved Performance at Low Temperatures
SAE AMS 7257	Rings, Sealing, Perfluorocarbon Rubber High Temperature Fluid Resistant
SAE/AS 5172	Methods for Test Aerospace Sealants
SAE/ARP 901, MIL-F-8815	Bubble Point Test Method
ASTM D1044	Surface Abrasion, Resistance of Transparent Plastics (Taber Abrader)
Fed Test Standard 141 Method 6301	Wet Adhesion (Tape Test) Use (SM-250 Tape)
ASTM D3363	Pencil Hardness
SAE/AS 4373	Test Methods for Insulated Electric Wire (R 1995)

DSO495 MIL-S-4383C	Sealing Compound, Topcoat, Fuel Tank, Buna-N type
MIL-S-7502C	Sealing Compound, Integral Fuel Tanks and Fuel Cell Cavities, High Adhesion, Accelerator Required (Use MIL-S-8802)
MIL-S-8802F (4)	Sealing Compound, Temperature-Resistant, Integral Fuel Tanks and Fuel Cell Cavities, High Adhesion
DoD-P-15328D	Primer (Wash), Pretreatment (Formula No. 117 for Metals) (Metric)
MIL-S-83430A	Sealing Compound, Integral Fuel Tanks and Fuel Cell Cavities, Intermittent use to 360 Deg. F (182 Deg. C) (Use AMS 3276)
MIL-F-87260	Foam Material, Explosion Suppression, Inherently Electrically Conductive, for Aircraft Fuel Tank and Dry Bay Areas
AMS 3281	Sealing Compound, Polysulfide (T) Synthetic Rubber for Integral Fuel Tank and Fuel Cell Cavities Low Density (1.35 sp gr max), for Intermittent Use to 360 Degrees F (182 Degrees C)
MIL-S-85334	Sealing Compound, Noncuring, Low Consistency, Silicone, Groove Injection, for Integral fuel Tanks
MIL-C-27725B	Coating, Corrosion Preventive, for Aircraft Integral Fuel Tanks
AMS 3265	<i>SAE</i> Sealing Compound, Polysulfide (T) Rubber Nonchromated, Corrosion Inhibiting for Intermittent Use to 340 Degrees C (171 Degrees F)
MIL-P-25732C	Packing, Preformed, Petroleum Hydraulic Fluid Resistant, Limited Service at 275 Deg. F (132 Deg. C)
MIL-P-5315B	Packing, Preformed, Hydrocarbon Fuel Resistant
AMS 7271H	<i>SAE</i> Rings, Sealing, Butadiene-Acrylonitrile (NBR), Rubber Fuel and Low Temperature Resistant 60 - 70
MIL-R-83248C	Rubber, Fluorocarbon elastomer, High temperature, Fluid and Compression Set Resistant

MIL-R-83248/1A	Rubber, Fluorocarbon Elastomer, High Temperature, Fluid and Compression Set Resistant (O-Rings, Class 1, 75 Hardness)
MIL-R-83248/2	Rubber, Fluorocarbon Elastomer, High Temperature, Fluid and Compression Set Resistant (O-Rings, Class 2, 90 Hardness)
MIL-P-83461B	Packing, Preformed, Petroleum Hydraulic fluid Resistant, Improved Performance at 275 Deg. F (135 Deg. C)
MIL-P-83461/1B	Packing, Preformed, Petroleum Hydraulic Fluid Resistant Improved Performance at 275 Deg. F (135 Deg. C) Sizes and Tolerances
MIL-P-83461/2	Packing, Preformed, Petroleum Hydraulic Fluid Resistant Improved Performance at 275 Deg. F (135 Deg. C) for use in Boss Fittings, Sizes and Tolerances
MIL-B-83054B	Baffle and Inerting Material, Aircraft Fuel Tank
MIL-H-4495D	Hose Assembly, Rubber, Aerial Refueling
MIL-H-370G	Hose and Hose Assemblies, Non-Metallic; Elastomeric, Liquid Fuel (Use A-A-52554)
MIL-H-17902F	Hose, End Fittings and Hose Assemblies, Synthetic Rubber Aircraft Fuels
MIL-H-26521J	Hose Assembly, Nonmetallic, Fuel, Collapsible, Low Temperature with Non-Reusable Couplings
MIL-I-7444D	Insulation Sleeving, Electrical, Flexible
ASTM D4066 Rev B	<i>ASTM</i> Standard Specification for Nylon Injection and Extrusion Materials (PA)
DoD-L-85645A (1)	Lubricant, Dry Thin Film, Molecular Bonded
1N5610 - 1N5613 <i>EIA</i> 2N5613 - 2N5620 <i>EIA</i> AMS5613P <i>SAE</i>	Steel, Corrosion and Heat Resistant, Bars, Wire, Forgings. Tubing and Rings 12.5 Cr (SAE 51410) Annealed (UNS S41000)
MIL-L-46010D	Lubricant, Solid Film Heat Cured, Corrosion Inhibiting

MIL-S-22473E (8)	Sealing, Locking, and Retaining Compounds: (Single Component)
MIL-S-8516F	Sealing Compound, Polysulfide Rubber, Electric Connectors and Electric Systems, Chemically Cured

Metallics

ASTM-945	Standard Test Method for Stress-Corrosion of Titanium Alloys by Aircraft Engine Cleaning Materials
ASTM D-2-1137	Research Report 20 Oct '81 "Support Data for D 4054"
ASTM 483-91	Total Immersion Corrosion Test for Aircraft Maintenance Chemicals
ASTM G1	Standard Practice for Preparing, Cleaning and Evaluating Corrosion Test Specimens
ASTM G46	Standard Guide for Examination and Evaluation of Pitting Corrosion

Fuels

ASTM D-3242	Standard Test Method for Acidity in Aviation Turbine Fuel
ASTM D-381	Standard Test for Existent Gum in Fuels by Jet Evaporation
ASTM D-3703	Standard Test Method for Peroxide Number of Aviation Turbine Fuels (<i>See Current Revision to ASTM-D-3703, Using New Voltametric Method</i>)
ASTM D 2624	Standard Test Method for Electrical Conductivity of Aviation and Distillate Fuels
ASTM D-4308	Electrical Conductivity of Liquid Hydrocarbons by Precision Meter
MIL-T-83133D	Turbine Fuels, Aviation, Kerosene Types, NATO-34 (JP-8) and NATO-35
ASTM D 4054	Standard Practice for Evaluating the Compatibility of Additives with Aviation Turbine Fuels and Aircraft Fuel System Materials

VII. PHOTOGRAPHS AND TEST RESULT DATA SHEET SAMPLES (Figures 1-8)

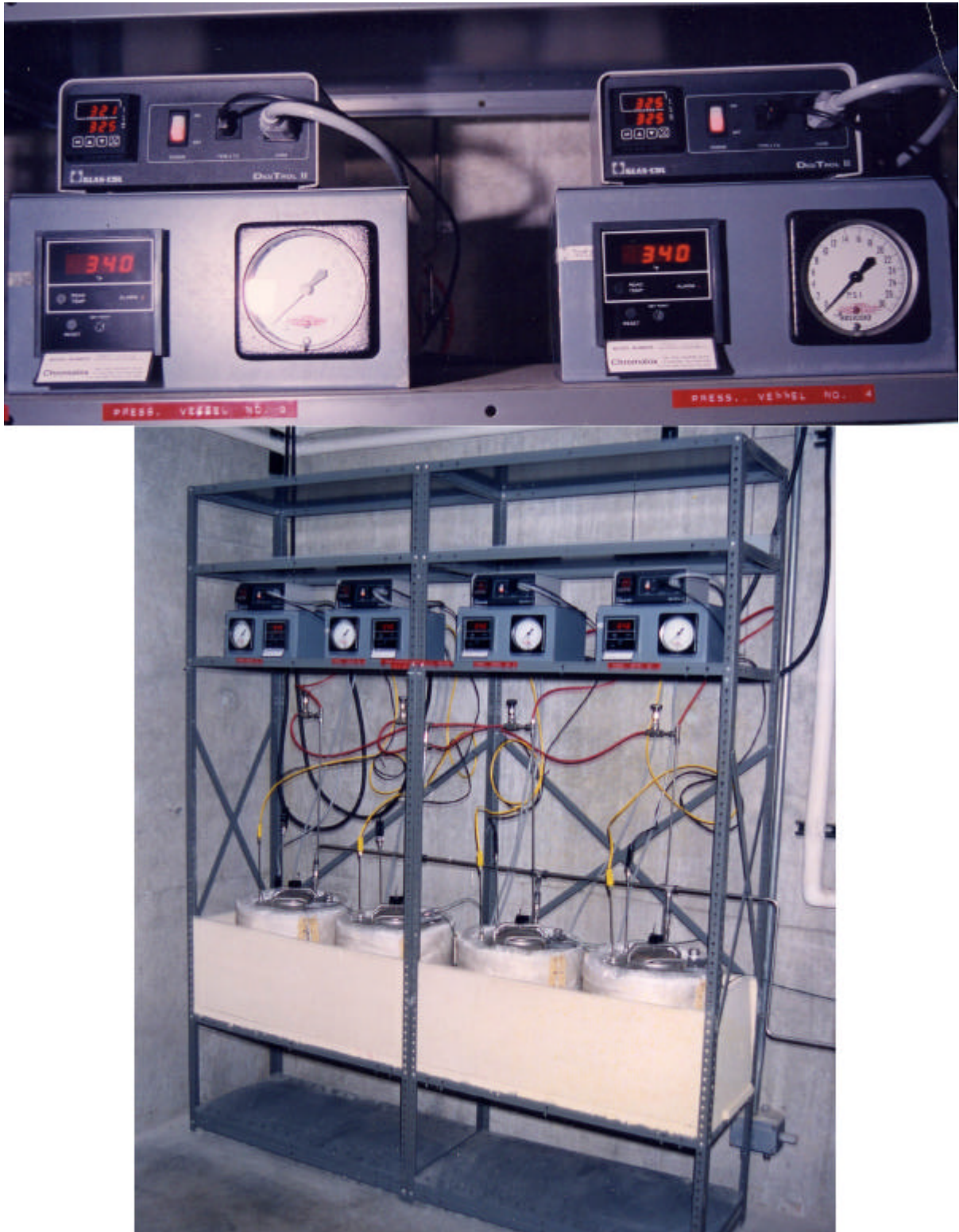
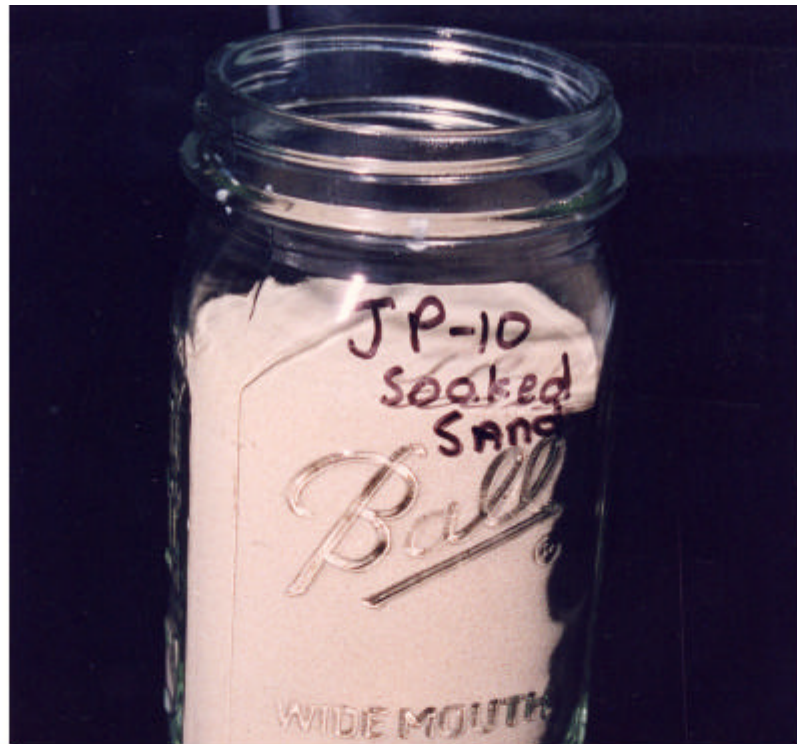


Figure 1: Top: Lower Temperature Controller and Over Temperature Control;
Bottom: Pressure Vessels (4 Each)



Fuels
Soaked
Sand



Figure 2: Typical Material / Fuel Test Configuration



Figure 3: Test Oven Modified with Insert (Explosion Proof)
For 325° F Aging of Materials



Figure 3a: Test Oven and Conductivity Meter



Figure 4: Left: “O” Ring Support (5 Rings) Compression Set (Gauge)
Right: “O” Rings & Compression Set Fixture in Jar



Figure 5: Metallics in 3 – 30 ml Beakers (9 each)
Ready for 3 Test Fuel Jars (Control, + 100, x4)

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO. _____	MATERIAL / IDENTITY: _____
TEST TEMPERATURE (°F) _____	USE: _____
EXPOSURE TIME (DAYS) _____	TEST ADDITIVE/FUEL: _____
TEST DATE START: _____	JP-8 BASELINE FUEL: _____

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA				EVALUATION OF TEST RESULTS						
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD’S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm’s)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (STRESSED) 200°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)														
ACID NO. mgKOH/gm														
GUMS mg/100ml														
HYDROPEROXIDES mM/l														
CONDUCTIVITY pS/m @72°F														
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: _____
UDRI TECH: _____
UDRI ENG: _____
UDRI P.I. ENG: _____
A.F. AUT. W/MLSE: _____
A.F. AUT. WL/POSF: _____

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

NON-METALLIC DATA SHEET (SAMPLE)

Figure 6

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO. _____
 TEST TEMPERATURE (°F) _____
 EXPOSURE TIME (DAYS) _____
 TEST DATE START: _____

MATERIAL / IDENTITY: _____
 USE: _____
 TEST ADDITIVE/FUEL: _____
 JP-8 BASELINE FUEL: _____

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4						
COLOR															
PITTING (VISUAL)															
PITTING (MICROSCOPY)															
AVG. WT. (gms)															
GAIN / LOSS (gms)															
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL		
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS		
							PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST				
COLOR (7 DAYS)																
CONDUCTIVITY (AVG. of 4) PS/M AT 72° F	PRE	POST	PRE	POST	PRE	POST										
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										

NOTES:

Metallic Color:	L = <i>Light (No Deposit)</i>	L1 - L2 = <i>Discoloration/Deposits</i>
Fuel Color:	C = <i>Clear</i>	C1 - C6 = <i>Light to Dark</i>
Designations:	NE = <i>Not Evaluated;</i>	ND = <i>Not Detected;</i> BD = <i>Below Detection</i> P = <i>Pitting</i>
Comparisons:	W = <i>Within Allowable Requirement;</i>	O = <i>Outside Allowable Requirement</i>
	OT = <i>Material Tested Beyond Temperature Range</i>	CN = <i>Control</i>
	N/A = <i>Not applicable;</i>	LT = <i>Less than 500 ppb</i>
	GT = <i>Greater than 500 ppb</i>	
	NSR = <i>No Spec. Req. and/or 4 (x) Additive Concentration</i>	

DATE: _____
 UDRI TECH: _____
 UTC ENG: _____
 UDRI P.I. ENG: _____
 A.F. AUT. W/MLSA: _____
 A.F. AUT. WL/POSF: _____

*Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

METALLIC DATA SHEET (SAMPLE)

Figure 7

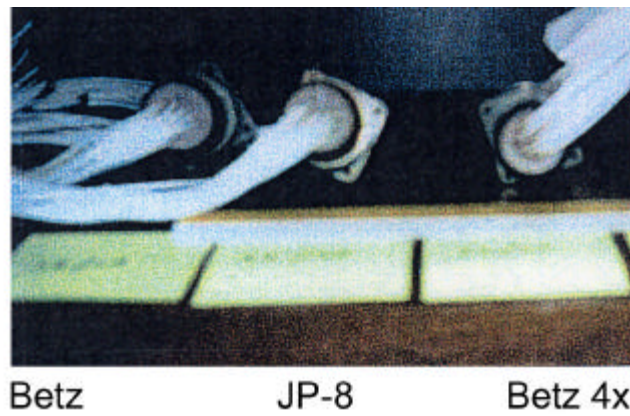


Figure 8: I.P.2.2. Electrical Connectors with Polysulfide Potting Compound MIL-S-8516
Illustrating High Shrinkage Around Electrical Wire Conductor Insulation

VIII. TEST RESULT SUMMARY SHEETS
(28 Days / 7 Days)

FUEL / MATERIAL TEST RESULT SUMMARY TABLE
 JP-8, JP-8 + 100 AND JP 8 + 100 X4 (JP-8 + 100 AND JP-8 + 100 X4 W/ BETZ/DEARBORN/8Q462)
 TEST DURATION 28 DAYS AT SPECIFIED TEMPERATURES (° F)

D H K / U D R I

TEST PLAN I.D. No.	AIRCRAFT USE	MILITARY MATERIAL DESIGNATION	TYPE MATERIAL	OVERALL TEST EVALUATION RESULTS & TEST STATUS														
				Ambient			200 ° F			250 / 275 ° F			325 ° F			400 ° F		
				JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4
I.A.1	Adhesive	Epoxy/Polyamide	Epoxy/Poly- amide				W	W	W									
I.A.2	Adhesive	Vinyl Phenolic	Vinyl Phenolic				W	W	W									
I.A.3	Adhesive	Nitrile Mod. Epoxy	Nitrile	W/	W/	W/	OT	OT	OT									
I.A.4	Adhesive	Mod. Hi. Temp. Epoxy	Epoxy				W	W	W									
I.A.5	Adhesive	Un. Mod. Epoxy	Epoxy				W	W	W									
I.A.6	Adhesive	Primer Nitrile Mod. Epoxy	Nitrile Epoxy				W	W	W									
I.A.7	Adhesive	Primer	Primer				W	W	W									
I.A.8	Adhesive	Primer	Primer				NT	NT	NT									
I.A.9	Adhesive	Coating Explosion ¹ Suppression Foam Adhesive	Nitrile				O	W	W									
I.A.10	Adhesive	Acrylic Adhesive	Acrylic				O	O	O									
I.A.11.1	Adhesive	Filled Epoxy (1:1 mix)	Epoxy				W	W	W									
I.A.11.2	Adhesive	Filled Epoxy (2:1 mix)	Epoxy				W	W	W									

¹ Tested as a coating (tape adhesion and pencil)

KEY TO SYMBOLS

W = Within Acceptable Requirement
 O = Outside Acceptable Requirement
 OT = Tested Beyond Material's Temperature Range
 * Denotes 7 - Day Test Data Available

I = Test Planned (Incomplete)
 E = Evaluation Incomplete (Tested)
 NT = No Test Planned
 CN = Control

FUEL / MATERIAL TEST RESULT SUMMARY TABLE
 JP-8, JP-8 + 100 AND JP 8 + 100 X4 (JP-8 + 100 AND JP-8 + 100 X4 W/ BETZ/DEARBORN/8Q462)
 TEST DURATION 28 DAYS AT SPECIFIED TEMPERATURES (° F)

D H K / U D R I

TEST PLAN I.D.No	AIRCRAFT USE	MILITARY MATERIAL DESIGNATION	TYPE MATERIAL	OVERALL TEST EVALUATION RESULTS & TEST STATUS														
				160/180 ° F			200 ° F			250 / 275 ° F			325 ° F			400 ° F		
				JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4
I.B.1	Fuel Bladder	Innerliner	Nitrile				OT	W	W									
I.B.2	Fuel Bladder	Innerliner	Nitrile				OT	W	W									
I.B.3	Fuel Bladder	Innerliner	Polyurethane				W	W	W									
I.B.4	Fuel Bladder	Innerliner	Nitrile	W/	W/	W/	OT*	OT*	OT*									
I.B.5	Fuel Bladder	Innerliner	Polyurethane	W/	O/	O/	OT*	OT*	OT*									
I.B.6	Fuel Bladder	Self Sealing Innerliner	Nitrile				NT	NT	NT									
I.B.7	Fuel Bladder	Innerliner	Nitrile				OT	OT	OT									
I.B.8	Fuel Bladder	Innerliner	Urethane				OT	W	W									
I.B.9	Fuel Bladder	Innerliner	Nitrile				NT	NT	NT									
I.B.10	Fuel Bladder	Repair Material	Polyurethane				NT	NT	NT									
I.B.11	Fuel Bladder	Bladder Cloth	Nylon (36"x60")				W	W	W									
I.B.12	Fuel Bladder	Bladder Cloth	Polyester (42"x48")				W	W	W									
I.B.13	Fuel Bladder	Bladder Cloth	Nylon cloth				OT	W	W									
I.B.14	Fuel Bladder	Bladder Cloth	Nylon cloth				W	W	W									
I.B.15	Fuel Bladder	Self Seal	Nitrile				W	W	NT									
I.B.16	Fuel Bladder	Self Sealing	Polyurethane				W	W	NT									

KEY TO SYMBOLS

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 OT = Tested Beyond Material's Temperature Range
 * Denotes 7 - Day Test Data Available

I = Test Planned (Incomplete)
 E = Evaluation Incomplete (Tested)
 NT = No Test Planned
 CN = Control

FUEL / MATERIAL TEST RESULT SUMMARY TABLE
 JP-8, JP-8 + 100 AND JP 8 + 100 X4 (JP-8 + 100 AND JP-8 + 100 X4 W/ BETZ/DEARBORN/8Q462)
 TEST DURATION 28 DAYS AT SPECIFIED TEMPERATURES (° F)

D H K / U D R I

TEST PLAN I.D.No	AIRCRAFT USE	MILITARY MATERIAL DESIGNATION	TYPE MATERIAL	OVERALL TEST EVALUATION RESULTS & TEST STATUS														
				120/180 ° F			200 ° F			250 / 275 ° F			325 ° F			400 ° F		
				JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4
I.C.1	Int. Fuel Tank	Coating, MIL-S-4383	Nitrile				O	W	W									
I.C.2	Int. Fuel Tank	Coating, MIL-C-27725	Polyurethane				W*	W*	W*									
I.C.3	Int. Fuel Tank	Coating	Epoxy				W	W	W									
I.C.4 / I.D.2	Int. Fuel Tank	MIL-S-8802	Manganese				W	W	W									
I.C.5	Int. Fuel Tank	New Spray/PreCoat-					W	W	W									
I.C.6	Ground Tank Fuel Storage	Note: Test at 100 ° F 3 part epoxy system MIL-P-24441 A-36 plate steel, lapweld /20 Form 150 Type III /30 Form 151 Type IV /31 Form 152 Type IV 6010 carbon steel	Epoxy	W/	W/	W/												
			Polyamide 2-4 mil thick 8-10 mil max thick	W/	W/	W/												

Note: I/ Test at 100 ° F

KEY TO SYMBOLS

W = Within Acceptable Requirement
 O = Outside Acceptable Requirement
 OT = Tested Beyond Material's Temperature Range
 * Denotes 7 - Day Test Data Available

I = Test Planned (Incomplete)
 E = Evaluation Incomplete (Tested)
 NT = No Test Planned
 CN = Control

FUEL / MATERIAL TEST RESULT SUMMARY TABLE
 JP-8, JP-8 + 100 AND JP 8 + 100 X4 (JP-8 + 100 AND JP-8 + 100 X4 W/ BETZ/DEARBORN/8Q462)
 TEST DURATION 28 DAYS AT SPECIFIED TEMPERATURES (° F)

D H K / U D R I

TEST PLAN I.D.No	AIRCRAFT USE	MILITARY MATERIAL DESIGNATION	TYPE MATERIAL	OVERALL TEST EVALUATION RESULTS & TEST STATUS														
				160/180 ° F			200 ° F			250 / 275 ° F			325 ° F			400 ° F		
				JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4
I.D.1	Int. Fuel Tank	Sealant, MIL-S-8802	Dichromate				W	W	W									
I.D.2/I.O.4	Int. Fuel Tank	Sealant, MIL-S-8802F	Manganese				W*	W*	W*									
I.D.3	Int. Fuel Tank	Sealant (C); MIL-S-83430A	Manganese				W	W	W									
I.D.4	Int. Fuel Tank	Sealant, MIL-S-7502	Lead Dioxide				NT	NT	NT									
I.D.5	Int. Fuel Tank	Sealant, Primer AMS 3375	Fluorosilicone				W	W	W									
I.D.6	Int. Fuel Tank	Spray Sealant AMS 3279	Polyurethane	W ¹ /	W/	W/	W	W	W									
I.D.7	Int. Fuel Tank	Sealant, AMS 3277	Polythioether				W	W	W									
I.D.8	Int. Fuel Tank	Sealant, AMS 3281	Polysulfide	W/	W/	O/	OT	OT	OT									
I.D.9	Int. Fuel Tank	Sealant, AMS 3265	Polysulfide	W/	W/	O/	OT	OT	OT									
I.D.10	Int. Fuel Tank	Sealant, AMS 3283	Polysulfide				W	W	W									
I.D.11	Int. Fuel Tank	Sealant, MIL-S-85334, Groove Injection	Fluorosilicone				W	W	W									
I.D.12	Int. Fuel Tank	Sealant, Groove Injection	Cynasilicone				NT	NT	NT									

1 Tested 70 days at 140°F

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F U E L / M A T E R I A L T E S T R E S U L T S U M M A R Y T A B L E
 JP-8, JP-8 + 100 AND JP 8 + 100 X4 (JP-8 + 100 AND JP-8 + 100 X4 W/ BETZ/DEARBORN/8Q462)
 T E S T D U R A T I O N 2 8 D A Y S A T S P E C I F I E D T E M P E R A T U R E S (° F)

D H K / U D R I

TEST PLAN I.D.No	AIRCRAFT USE	MILITARY MATERIAL DESIGNATION	TYPE MATERIAL	OVERALL TEST EVALUATION RESULTS & TEST STATUS														
				160/180 ° F			200 ° F			250 / 275 ° F			325 ° F			400 ° F		
				JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4
I.E.1	Int. Fuel Tank	Composite, AS 4/3501-6	Epoxy Graphite				W*	W*	W*									
I.E.2	Int. Fuel Tank	Composite, IM 7/5250-4	Graphite Bismaliemide				W*	W*	W*									
I.E.3	Int. Fuel Tank	Composite, AS7/8551-7A	Epoxy Graphite				W	W	W									
I.E.4	Vent Lines	Composite	Fiberglass				NT	NT	NT									
I.E.5	Isolator Tube	Composite	Epoxy Resin				NT	NT	NT									

K E Y T O S Y M B O L S

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FUEL / MATERIAL TEST RESULT SUMMARY TABLE
 JP-8, JP-8 + 100 AND JP 8 + 100 X4 (JP-8 + 100 AND JP-8 + 100 X4 W/ BETZ/DEARBORN/8Q462)
 TEST DURATION 28 DAYS AT SPECIFIED TEMPERATURES (° F)

D H K / U D R I

TEST PLAN I.D.No	AIRCRAFT USE	MILITARY MATERIAL DESIGNATION	TYPE MATERIAL	OVERALL TEST EVALUATION RESULTS & TEST STATUS														
				160/180 ° F			200 ° F			250 / 275 ° F			325 ° F			400 ° F		
				JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4
I.F.1 .1 .2	Fuel Filter 11/18/97 11/18/97	AC-B683F-2435 AC-B253F-2435Y1, 1/4	F-100 Eng. F-110 Eng.							W/- W/.	NT	W/- W/.						
I.F.2.	Fuel Filter 14 Aug '97	AC-9985F-10	T-700 Eng.							W/ -	NT	W/ -						
I.F.3	Fuel Tank Explosion Suppression	Foam, Yellow Type II, MIL-B-83054	Polyurethane (Ester)				W*	W*	W*									
I.F.4	Fuel Tank Explosion Suppression	Foam, Blue IV, MIL-B-83054	Polyurethane (Ether)				W*	W*	W*									
I.F.5	Fuel Tank Explosion Suppression	Foam (ESM), Charcoal Gray, Class I MIL-F-87260	Polyurethane (Ether)				W*	W*	W*									
I.F.6	Fuel Tank Explosion Suppression	Foam Charcoal Gray, Class II. MIL-F-87260	Polyurethane (Ether)				W	W	W									
I.F.7	Fuel Tank Explosion Suppression	Foam Charcoal Gray, Class II. MIL-F-87260	Polyurethane (Ether)				NT	NT	NT									
I.F.8	Fuel Tank Explosion Suppression	Foam Yellow, Type II, Non- Conductive, MIL-B-83054B	Polyurethane (Ester)				NT	NT	NT									
I.F.9	Fuel Tank Explosion Suppression	Beige (tan), Type II, Non- Cond, MIL-B-83054B	Polyester (Ester)	W/	W/	W/												

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FUEL / MATERIAL TEST RESULT SUMMARY TABLE
 JP-8, JP-8 + 100 AND JP 8 + 100 X4 (JP-8 + 100 AND JP-8 + 100 X4 W/ BETZ/DEARBORN/8Q462)
 TEST DURATION 28 DAYS AT SPECIFIED TEMPERATURES (° F)

D H K / U D R I

TEST PLAN I.D.No	AIRCRAFT USE	MILITARY MATERIAL DESIGNATION	TYPE MATERIAL	OVERALL TEST EVALUATION RESULTS & TEST STATUS														
				160/180 ° F			200 ° F			250 / 275 ° F			325 ° F			400 ° F		
				JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4
I.G.1	Plumbing Gasket	“O” Ring,, MIL-P-83461 (Hydraulic)	Nitrile	O/	O/	O/	O	O	O									
I.G.2	Plumbing Gasket	“O” Ring, MIL-P-25732 (Hydraulic)	Nitrile	O/	O/	O/	O*	O*	O*									
I.G.3	Plumbing Gasket	“O” Ring, MIL-P-5315	Nitrile	O/ OT	W/ OT	W/ OT	OT	OT	OT				OT	OT	OT			
I.G.4	Plumbing Gasket	“O” Ring, AMS-7271 / MS9201	Nitrile	W/	W/	W/	OT	OT	OT									
I.G.5 (II.G.2)	Plumbing Gasket	“O” Ring, MIL-R-25988	Fluorosilicone				W*	W*	W*	(OT/)	(W/)	(W/)	(OT)*	(OT)*	(OT)*			
I.G.6 (II.G.9)	Plumbing Gasket	“O” Ring, MIL-R-83248	Fluorocarbon				W*	W*	W*				(O)	(W)	(O)			
I.G.7 (II.G.3)	Plumbing Gasket	“O” Ring MIL-R-83485	Fluorocarbon				W	W	W				(W)*	(W)*	(W)*	(W)	(W)	(W)
I.G.8 (II.G.4)	Plumbing Gasket	“O” Ring, AMS-7257A	Perfluoro- elastomer				W ¹	W ¹	W ¹				(O)*	(W)*	(W)*			
I.G.9	Plumbing Gasket	“O” Ring	Type S Nitrile	O/	W/	W/	OT	OT	OT									
I.G.10 (II.G.1)	Plumbing Gasket	“O” Ring, MIL-R-25988	Fluorosilicone				NT	NT	NT									
I.G.11 (II.G.10)	Plumbing Gasket	Washer, Seal	Urethane	W/	W/	W/	OT	OT	OT									
I.G.12 (II.G.11)	Plumbing Gasket	Tang, Seal	Urethane				W	W	W				(OT)	(OT)	(OT)			
I.G.13	Plumbing Gasket	Cork, Seal	Cork				W	W	W									

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FUEL / MATERIAL TEST RESULT SUMMARY TABLE
 JP-8, JP-8 + 100 AND JP 8 + 100 X4 (JP-8 + 100 AND JP-8 + 100 X4 W/ BETZ/DEARBORN/8Q462)
 TEST DURATION 28 DAYS AT SPECIFIED TEMPERATURES (° F)

D H K / U D R I

TEST PLAN I.D.No	AIRCRAFT USE	MILITARY MATERIAL DESIGNATION	TYPE MATERIAL	OVERALL TEST EVALUATION RESULTS & TEST STATUS														
				160/180 ° F			200 ° F			250 / 275 ° F			325 ° F			400 ° F		
				JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4
II.G.1 (I.G.10)	Engine Plumbing	“O” Ring, MIL-R-25988	Fluorosilicone				(NT)	(NT)	(NT)	/OT	/OT	/OT	OT	OT	OT			
II.G.2 (I.G.5)	Engine Plumbing	“O” Ring, MIL-R-25988	Fluorosilicone				(W)*	(W)*	(W)*	OT/	W/	W/	OT*	OT*	OT*			
II.G.3 (I.G.7)	Engine Plumbing	“O” Ring, MIL-R-83485 (Low Temp. Material)	Fluorocarbon				(W)	(W)	(W)				W	W	W	W	W	W
II.G.4 (I.G.8)	Engine Plumbing	“O” Ring AMS7257A	Perfluoro- elastomer				(W) ¹	(W) ¹	(W) ¹				W	W	W			
II.G.5	Engine Plumbing	“O” Ring, MIL-R-25988	Fluorosilicone							/OT	/OT	/OT	OT ¹	OT ¹	OT ¹			
II.G.6	Engine Plumbing	“O” Ring, MIL-R-83485	Fluorocarbon										W	W	W	OT	OT	OT
II.G.7	Engine Plumbing	“O” Ring, MIL-R-25988	Fluorosilicone										OT*	OT*	OT*			
II.G.8	Engine Plumbing	“O” Ring, AMS 7257A	Perfluoro- elastomer										O	O	O			
II.G.9 (I.G.6)	Engine Plumbing	“O” Rings, MIL-R-83248	Fluorocarbon				(W)*	(W)*	(W)*				O	W	O			
II.G.10 (I.G.11)	Plumbing Gasket	Washer, Seal	Urethane (See I.G.11)	(W)/	(W)/	(W)/	(OT)	(OT)	(OT)				OT	OT	OT			
II.G.11 (I.G.12)	Plumbing Gasket	Tang, Seal	(see I.G.12)				(W)	(W)	(W)				OT	OT	OT			

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FUEL / MATERIAL TEST RESULT SUMMARY TABLE
 JP-8, JP-8 + 100 AND JP 8 + 100 X4 (JP-8 + 100 AND JP-8 + 100 X4 W/ BETZ/DEARBORN/8Q462)
 TEST DURATION 28 DAYS AT SPECIFIED TEMPERATURES (° F)

D H K / U D R I

TEST PLAN I.D.No	AIRCRAFT USE	MILITARY MATERIAL DESIGNATION	TYPE MATERIAL	OVERALL TEST EVALUATION RESULTS & TEST STATUS														
				160/180 ° F			200 ° F			250 / 275 ° F			325 ° F			400 ° F		
				JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4
II.G.12	Plumbing Gasket	“O” Ring, MIL-R-83485	Fluorocarbon (Improved 777)										W ¹	W ¹	W ¹	W ¹	W ¹	W ¹
II.G.13	Plumbing Gasket	“O” Ring, MIL-R-25988	Fluorosilicone 677				W	W	W				OT	OT	OT			
II.G.14	Plumbing Gasket	“O” Ring, MIL-R-25988	Fluorosilicone (Teflon TM)	/W	/W	/W	NT	NT	NT				NT	NT	NT			
II.G.15	Plumbing Gasket	“O” Ring, MIL-R-25988	Fluorosilicone (Teflon TM)				W	W	W				NT	NT	NT			

Note: No Compression Set / Volume Swell / Hardness

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FUEL / MATERIAL TEST RESULT SUMMARY TABLE
 JP-8, JP-8 + 100 AND JP 8 + 100 X4 (JP-8 + 100 AND JP-8 + 100 X4 W/ BETZ/DEARBORN/8Q462)
 TEST DURATION 28 DAYS AT SPECIFIED TEMPERATURES (° F)

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TEST PLAN I.D.No	AIRCRAFT USE	MILITARY MATERIAL DESIGNATION	TYPE MATERIAL	OVERALL TEST EVALUATION RESULTS & TEST STATUS														
				160/180 ° F			200 ° F			250 / 275 ° F			325 ° F			400 ° F		
				JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4
I.H.1	Hose	Self-Sealing					NT	NT	NT									
I.H.2	Hose Aerial Refueling Tanker	MIL-H-4495	Acrylic/Nitrile	W/	NT	NT	OT	OT	OT									
I.H.3	Hose (Ground Refueling)	MIL-H-370	Nitrile	W/			OT	OT	OT									
I.H.4	Hose (Navy Aircraft Carrier)	MIL-H-17902	Nitrile	W/			OT	OT	OT									
I.H.5	Hose (Ground Refueling)	MIL-H-26521	Epichlorohydrin				OT	W	W									

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FUEL / MATERIAL TEST RESULT SUMMARY TABLE
 JP-8, JP-8 + 100 AND JP 8 + 100 X4 (JP-8 + 100 AND JP-8 + 100 X4 W/ BETZ/DEARBORN/8Q462)
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TEST PLAN I.D.No	AIRCRAFT USE	MILITARY MATERIAL DESIGNATION	TYPE MATERIAL	OVERALL TEST EVALUATION RESULTS & TEST STATUS														
				160/180 ° F			200 ° F			250 / 275 ° F			325 ° F			400 ° F		
				JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4
I.I. 1	Insulation/ Electrical Wire /Clamps/Misc.	Teflon	TFE (Teflon) (Film)				W	W	W									
I.I.2	Insulation/ Electrical Wire / Clamps/Misc.	ASTM D 4066	Nylon 101 Film OLD (Film)	O/	W/	W/	O	O	O									
			NEW Film				O	W	W									
I.I.3	Insulation/ Electrical Wire /Clamps/Misc.	Polyethylene Film	Polyethylene (HDP) (Film)				O	W	W									
I.I.4	Insulation/ Electrical Wire /Clamps/Misc.	UPILEX	Kapton (Film)				W	W	W									
I.I.5	Insulation/ Electrical Wire /Clamps/Misc.	Marmon clamp	KKK-125 (Pacific Molded)				NT	NT	NT									
I.I.6	Insulation/ Electrical Wire /Clamps/Misc.	MIL-I-7444 Type 1	Vinyl Plastic	O/	NT/	NT/	O	O	O									
I.I.7	Fuel Line Clamps & Electrical Ties	Kynar					W	W	W									
I.I.8	Bladder Tanks	See I.B.11, 12, 13, 14	Nylon Cloth				N/A	N/A	N/A									
I.I.9	Engine Fuel Control Stepper Motor	Magnetic Wire Insulation Type I	HML Varnish										CN	W	W			
I.I.10	Wire Insulation	Teflon / Kapton	Hybrid Teflon / Kapton (Wire)				W	W	W									
I.I.11	Wire Bundle Wrap	Shrink Wrap					NT	NT	NT									
I.I.12	Wire Insulation	Teflon Insulation, Wire Insulation	Wire				W	W	W									
I.I.13	Wire Insulation	Nylon Insulation, Wire Insulation	Wire				W	W	W									
I.I.13.1	Wire	Nylon Wire, Coax Shield	Wire				W	W	W									

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 JP-8, JP-8 + 100 AND JP 8 + 100 X4 (JP-8 + 100 AND JP-8 + 100 X4 W/ BETZ/DEARBORN/8Q462)
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TEST PLAN I.D.No	AIRCRAFT USE	MILITARY MATERIAL DESIGNATION	TYPE MATERIAL	OVERALL TEST EVALUATION RESULTS & TEST STATUS														
				160/180 ° F			200 ° F			250 / 275 ° F			325 ° F			400 ° F		
				JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4
I.J.1	Joining Material	2219-T87 (AL), Welded	UNS A 92319 4191D9 (AMS)				CN	W	W									
I.J.2	Joining Material	6AL-4V (Ti), Welded	Match Fill										CN	W	W			
I.J.3	Joining Material	3AL-2.5V (Ti), Welded	Match Fill										CN	W	W			
I.J.4	Joining Material	Inco 718 (Ni), Welded	Match Fill				CN	W	W				CN	W	W			
I.J.5	Joining Material	Inco 625 (Ni), Welded	Match Fill										CN	W	W			
I.J.6	Joining Material	321 (SS), Welded	Match Fill				CN	W	W				CN	W	W			
I.J.7	Joining Material	IN200/201, Welded	Match Fill										CN	W	W			
I.J.8	Joining Material	IN200/201, Welded	BNI (5 or 6)										CN	W	W			
I.J.9	Joining Material	Waspalloy (Ni), Brazed	AMS 4786 Ag										CN	W	W			
I.J.10	Joining Material	321 SS, Brazed	B Ag (5 or 6)										CN	W	W			
I.J.11	Joining Material	QQ-S-571,SN60 (Tin 60%, Lead 40%), B-36-21A	Tin & Lead (Solder Spots)				CN	W	W				OT	OT	OT			
I.J.12	Joining Material	6061 T-6 MIL-B-7883 Type V. Grade B, Dip Braze	4145 or 4147 fill				CN	W	W									
I.J.13	Joining Material	Ti, Cu, Ni Braze P & W	Ti, Cu, Ni										CN	W	W			
I.J.14	Joining Material	6061-T6 Welded with 4043 filler	Aluminum				CN	W	W				CN	W	W			
I.J.15	Joining Material	5052 H-34 Welded w/ 6061T6 w/ 5356 Filler	Aluminum				CN	W	W									
I.J.16	Joining Material	Sn 95, Sb05 Base Material, B 36-21A	Copper w/Solder Spots				CN	W	W									

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 JP-8, JP-8 + 100 AND JP 8 + 100 X4 (JP-8 + 100 AND JP-8 + 100 X4 W/ BETZ/DEARBORN/8Q462)
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D H K / U D R I

TEST PLAN I.D.No	AIRCRAFT USE	MILITARY MATERIAL DESIGNATION	TYPE MATERIAL	OVERALL TEST EVALUATION RESULTS & TEST STATUS														
				160/180 ° F			200 ° F			250 / 275 ° F			325 ° F			400 ° F		
				JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4
I.K.1.1	Airframe, Coatings	Cover Ink Stamp, EC 776, Top Coating QQ-A- 25011	(1 per test fuel)				W	W	W									
.2							W	W	W									
.3							W	W	W									
I.K.2	Airframe, Coatings	Dry Film Lubricant, Dicronite DoD-L-85645	Dicronite				NT	NT	NT									
I.K.3	Airframe, Coatings	Dry Thread Lubricant	Graphite				NT	NT	NT									
I.K.4	Airframe, Coatings	Name Plate, QQ-A-250/1, Color A11136 (Fed Std- 596)					W	W	W									
I.K.5	Airframe, Coatings	Dry Film Lubricant	Molybdenum Disulfide				NT	NT	NT									
I.K.6a	Airframe, Coatings		Aluminum Varnish				NT	NT	NT									
I.K.6b	Airframe, Coatings	Resin					NT	NT	NT									

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TEST PLAN I.D.No	AIRCRAFT USE	MILITARY MATERIAL DESIGNATION	TYPE MATERIAL	OVERALL TEST EVALUATION RESULTS & TEST STATUS														
				160/180 ° F			200 ° F			250 / 275 ° F			325 ° F			400 ° F		
				JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4
LK.6c	Airframe, Coatings	Reducer: Spec. No. 66-C-28					NT	NT	NT									
LK.7	Airframe, Coatings	Pump, Carbon Bearing,	SS, 410, RC 26-34, AMS 5613				W	W	W									
LK.8.1	Airframe, Coatings	Pump Carbon Bearing	OP-658 (Carbon)										NT	NT	NT			
LK.8.2	Airframe, Coatings	Pump Carbon Bearing	Bearings										W	W	W			
LK.8.3	Airframe Coatings	Pump Carbon Bearing	Bearings										W	W	W			
LK.9	Airframe, Coatings	Seal, MIL-L-46010B,Type I	Sliding Seal				NT	NT	NT									
LK.10.1	Airframe, Qty. Probe	Probe	Coating				I ₂	I ₂	I ₂									
LK.10.2	Airframe, Qty. Probe	Fuel Quantity Probe	Coating				I ₂	I ₂	I ₂									
LK.11.1	Airframe, Qty. Probe	Fuel Quantity Probe	Coating				I ₂	I ₂	I ₂									
LK.11.2	Airframe, Qty. Probe	Fuel Quantity Probe	Coating				I ₂	I ₂	I ₂									
LK.12	Airframe, Qty. Probe	Fuel Quantity Probe, Material	Polyphenylene Sulfide 40% glass filled				W	W	W									

Note: I₂ = To Be Tested As An Assembly in a Follow-on Program

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D H K / U D R I

TEST PLAN I.D.No	AIRCRAFT USE	MILITARY MATERIAL DESIGNATION	TYPE MATERIAL	OVERALL TEST EVALUATION RESULTS & TEST STATUS														
				160/180 ° F			200 ° F			250 / 275 ° F			325 ° F			400 ° F		
				JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4
I.L.1	Locking Devices	Threadlock, MIL-S- 22473 Grade A or AV,	Cyanoacrilicate				W	W	W									
I.L.2	Locking Devices	Threadlock, MIL-S- 22473, (Red)	Cyanoacrilicate				W	W	W									
I.L.3	Locking Devices	Threadlock, MIL-S- 22473 (Brown)	Cyanoacrilicate				W	W	W									
I.L.4	Locking Devices	Lockwire, See Metals Category (I.M.19/II.M.10)	AMS 5688H wire (30302)				N/A	N/A	N/A									

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FUEL / MATERIAL TEST RESULT SUMMARY TABLE
 JP-8, JP-8 + 100 AND JP 8 + 100 X4 (JP-8 + 100 AND JP-8 + 100 X4 W/ BETZ/DEARBORN/8Q462)
 TEST DURATION 28 DAYS AT SPECIFIED TEMPERATURES (° F)

D H K / U D R I

TEST PLAN I.D.No	AIRCRAFT USE	MILITARY MATERIAL DESIGNATION	TYPE MATERIAL	OVERALL TEST EVALUATION RESULTS & TEST STATUS														
				160/180 ° F			200 ° F			250 / 275 ° F			325 ° F			400 ° F		
				JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4
LM.1	Airframe, Tank, & Plumbing	5052-0 Bare	Aluminum				CN	W	W				CN	W	W			
LM.2	Airframe, Tank, & Plumbing	6061-T4 Bare	Aluminum				CN	W	W				OT	OT	OT			
LM.3	Airframe, Tank, & Plumbing	6061-T6 Bare	Aluminum				CN	W	W				CN	W	W			
LM.4	Airframe, Tank, & Plumbing	7075-T6 Chromic Acid Anodize	Aluminum				CN	W	W				OT	OT	OT			
LM.5	Airframe, Tank, & Plumbing	7075-T6 Alodine/200	Aluminum				CN	W	W				OT	OT	OT			
LM.6	Airframe, Tank, & Plumbing	7075-T6 Bare	Aluminum				CN	W	W				OT	OT	OT			
LM.7	Airframe, Tank, & Plumbing	2024-T3 Bare	Aluminum				CN	W	W				CN	W	W			
LM.8	Airframe, Tank, & Plumbing	2219-T87 Bare	Aluminum				CN	W	W				OT	OT	OT			
LM.9	Airframe, Tank, & Plumbing	3003 Bare	Aluminum				CN	W	W				CN	W	W			
LM.10 (I.L.M.19)	Airframe, Tank, & Plumbing	C-355-T6	Aluminum				CN	W	W									
LM.11 (I.L.M.20)	Airframe, Tank, & Plumbing	C-356-T6	Aluminum				CN	W	W									
LM.12	Airframe, Tank, & Plumbing	7050-T74	Aluminum				CN	W	W									
LM.13 *I.L.M.13)	Airframe, Tank, & Plumbing	316	Stainless Steel				CN	W	W									
LM.14 (I.L.M.14)	Airframe, Tank, & Plumbing	321	Stainless Steel				CN	W	W									

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FUEL / MATERIAL TEST RESULT SUMMARY TABLE
 JP-8, JP-8 + 100 AND JP 8 + 100 X4 (JP-8 + 100 AND JP-8 + 100 X4 W/ BETZ/DEARBORN/8Q462)
 TEST DURATION 28 DAYS AT SPECIFIED TEMPERATURES (° F)

D H K / U D R I

TEST PLAN I.D.No	AIRCRAFT USE	MILITARY MATERIAL DESIGNATION	TYPE MATERIAL	OVERALL TEST EVALUATION RESULTS & TEST STATUS														
				160/180 ° F			200 ° F			250 / 275 ° F			325 ° F			400 ° F		
				JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4
LM.15 (I.M.12)	Airframe, Tank, & Plumbing	304	Stainless Steel				CN	W	W									
LM.16 (I.M.6)	Airframe, Tank, & Plumbing	INCO 718	Nickel				CN	W	W									
LM.17 (I.M.11)	Airframe, Tank, & Plumbing	440C	Stainless Steel				CN	W	W									
LM.18 (I.M.8)	Airframe, Tank, & Plumbing	347	Stainless Steel				CN	W	W									
LM.19 (I.M.10)	Airframe, Tank, & Plumbing	AMS, 5688H (Wire) (Lockwire)	Stainless Steel				CN	W	W									
LM.20 (I.M.24)	Airframe, Tank, & Plumbing	17-4 Ph AMS 5604/5643	Stainless Steel				CN	W	W									
LM.21	Airframe, Tank, & Plumbing	1010 Cadmium Plate (Class 2)	Ferrous										CN	W	W			
LM.22	Airframe, Tank, & Plumbing	1010 Zinc	Ferrous										CN	W	W			
LM.23	Airframe, Tank, & Plumbing	4130 Cadmium Plate (Class II) Type 2, Gold	Ferrous				CN	W	W				CN	W	W			
LM.24 (I.M.1)	Airframe, Tank, & Plumbing	6AL-4V	Titanium				CN	W	W									
LM.25	Airframe, Tank, & Plumbing	950 Bronze Aluminum	Copper/AL				CN	W	W				CN	W	W			
LM.26A	Airframe, Tank, & Plumbing	Naval Brass	Copper/Nickel 70-30				CN	W	W									
LM.26B	Airframe, Tank, & Plumbing	Naval Brass	Copper/Nickel 90-10				CN	W	W									
LM.27	Airframe, Tank, & Plumbing	Brass, Sheet 268 Substitute 260	Copper	CN/	W/	W/	CN	W	W				CN	W	W			

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FUEL / MATERIAL TEST RESULT SUMMARY TABLE
 JP-8, JP-8 + 100 AND JP 8 + 100 X4 (JP-8 + 100 AND JP-8 + 100 X4 W/ BETZ/DEARBORN/8Q462)
 TEST DURATION 28 DAYS AT SPECIFIED TEMPERATURES (° F)

D H K / U D R I

TEST PLAN I.D.No	AIRCRAFT USE	MILITARY MATERIAL DESIGNATION	TYPE MATERIAL	OVERALL TEST EVALUATION RESULTS & TEST STATUS														
				160/180 ° F			200 ° F			250 / 275 ° F			325 ° F			400 ° F		
				JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4
LM.28	Airframe, Tank, & Plumbing	Lead, AMS 4751/4750	Lead				CN	W	W				CN	W	W			
LM.29	Airframe, Tank, & Plumbing	Barium, Ferrite (Shaw Aerospace)	Barium	CN/	W/	W/	OT ¹	OT ¹	OT ¹				OT ¹	OT ¹	OT ¹			
LM.30	Airframe, Tank, & Plumbing	Neo-dymium (Shaw Aerospace)	(1 per fuel)				CN	W	W				CN ¹	W ¹	W ¹			
LM.31	Airframe, Tank, & Plumbing	Brass Sheet, B36-91A	Copper				CN	W	W				CN	W	W			
LM.32	Airframe, Tank, & Plumbing	1010 Bare	Ferrous				CN	W	W				CN	W	W			
LM.33	Airframe, Tank, & Plumbing	B-29	Soft Lead				CN	W	W									
LM.34 (ILM.27)	Airframe, Tank, & Plumbing	Monel 400, Sheet	Nickel/Copper				NT	NT	NT				(CN)	(W)	(W)			
LM.35	Airframe, Tank, & Plumbing	15-5 PH	Ferrous Cr, Ni, Cu										CN	W	W			
LM.36	Airframe, Tank, & Plumbing	5052-H34	Aluminum				CN	W	W									
LM.37 LM.23	Airframe, Tank, & Plumbing	4130 Cadmium Plate (Class II, Type 2, Gold)	Ferrous										CN	W	W			
LM.38	Airframe, Tank, & Plumbing	1045 Bare	Ferrous										CN	W	W			
LM.39	Airframe, Tank, & Plumbing	Magnesium AZ91 T-6 (Substitute AZ31-H24)	Magnesium				CN	W	W									
LM.40	Airframe, Tank, & Plumbing	4130 Bare	Ferrous, Steel										CN	W	W			
LM.41	Airframe, Tank, & Plumbing	SN 95, SbO5 Wire 0.20"	Solder (0.020)				CN	W	W									
LM.42	Airframe, Tank, & Plumbing	2014T6 AMS 4029	Aluminum				CN	W	W									
LM.43	Airframe, Tank, & Plumbing	4340 , AMS6415 280KSI Tensile	Steel Bar Stock										CN	W	W			

¹ Magnetic Properties Significant Loss

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FUEL / MATERIAL TEST RESULT SUMMARY TABLE
 JP-8, JP-8 + 100 AND JP 8 + 100 X4 (JP-8 + 100 AND JP-8 + 100 X4 W/ BETZ/DEARBORN/8Q462)
 TEST DURATION 28 DAYS AT SPECIFIED TEMPERATURES (° F)

D H K / U D R I

TEST PLAN I.D.No	AIRCRAFT USE	MILITARY MATERIAL DESIGNATION	TYPE MATERIAL	OVERALL TEST EVALUATION RESULTS & TEST STATUS														
				160/180 ° F			200 ° F			250 / 275 ° F			325 ° F			400 ° F		
				JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4
II.M.1 (I.M.24)	Eng. Fuel lines & Components	6AL-4V	Titanium										CN	W	W			
II.M.2	Eng. Fuel lines & Components	3AL-2.5V (Tubing)	Titanium				CN	W	W				CN	W	W	CN	W	W
II.M.3	Eng. Fuel lines & Components	Hastalloy	Nickel				CN	W	W				CN	W	W			
II.M.4	Eng. Fuel lines & Components	Waspalloy	Nickel				CN	W	W				CN	W	W			
II.M.5	Eng. Fuel lines & Components	INCO 625	Nickel				CN	W	W				CN	W	W			
II.M.6 (I.M.16)	Eng. Fuel lines & Components	INCO 718	Nickel				CN	W	W				CN	W	W			
II.M.7	Eng. Fuel lines & Components	Stellite 30	Chromium/ Carbide										CN	W	W			
II.M.8 (I.M.18)	Eng. Fuel lines & Components	347	Stainless Steel										CN	W	W			
II.M.9	Eng. Fuel lines & Components	Greek Ascolloy (30302)	Ferrous				CN	W	W				CN	W	W			
II.M.10 (I.M.19)	Eng. Fuel lines & Components	AMS 5688H (S.S. Wire) (30302)	Ferrous										CN	W	W			
II.M.11 (I.M.17)	Eng. Fuel lines & Components	440C	Stainless Steel										CN	W	W			
II.M.12 (I.M.15)	Eng. Fuel lines & Components	304	Stainless Steel										CN	W	W			
II.M.13 (I.M.13)	Eng. Fuel lines & Components	316	Stainless Steel										CN	W	W			

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FUEL / MATERIAL TEST RESULT SUMMARY TABLE
 JP-8, JP-8 + 100 AND JP 8 + 100 X4 (JP-8 + 100 AND JP-8 + 100 X4 W/ BETZ/DEARBORN/8Q462)
 TEST DURATION 28 DAYS AT SPECIFIED TEMPERATURES (° F)

D H K / U D R I

TEST PLAN I.D.No	AIRCRAFT USE	MILITARY MATERIAL DESIGNATION	TYPE MATERIAL	OVERALL TEST EVALUATION RESULTS & TEST STATUS														
				160/180 ° F			200 ° F			250 / 275 ° F			325 ° F			400 ° F		
				JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4
II.M.14 (I.M.14)	Eng. Fuel lines & Components	321	Stainless Steel										CN	W	W			
II.M.15	Blank	Blank	Blank															
II.M.16	Eng. Fuel lines & Components	ASI 51410 SS (AMS 5504-J)	Stainless Steel										CN	W	W			
II.M.17 (II.M.11) (I.M.17)	Eng. Fuel lines & Components	440C AMS 5630 Duplicate, See II.M.11	Steel										CN	W	W			
II.M.18	Eng. Fuel lines & Components	CPM 10-V	Powder Metallurgy rolled Fe, V, Cr, C, Mn, Si, T, S, Mo										CN	W	W			
II.M.19 (I.M.10)	Eng. Fuel lines & Components	C-355 T6	Aluminum										CN	W	W			
II.M.20 (I.M.11)	Eng. Fuel lines & Components	C-356 T6	Aluminum										CN	W	W			
II.M.21	Eng. Fuel lines & Components	A-286 AMS 5525 Silver Plate (2410)	Ferrous				CN	W	W				CN	W	W			
II.M.22	Eng. Fuel lines & Components	135 Modified (MIL-S- 6709 AMS 6470 J)	Nitralloy				CN	W	W				CN	W	W			
II.M.23 .1 .2 .3 .4	Eng. Fuel lines & Components	Bronze, Leaded (Tap MS 285) .1) Saw Cut, Cut up Bearing	Copper	CN**/	W**/	W**/	CN	W	W				CN	W	W			
		.2) Polished Cylinder	Polished Cylinder Dry Lub End	CN**/	W**/	W**/	CN	W	W				CN	W	W			
		.3) Coated Cylinder (Indium)	Indium Cyl. Surf. Dry Lub End										CN	W	W			
		.4) Coated Cylinder (Indium)	Indium All Cu Surf. Dry Lub End										CN	W	W	CN	W	W

** Ambient Temperature, this material only

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FUEL / MATERIAL TEST RESULT SUMMARY TABLE
 JP-8, JP-8 + 100 AND JP 8 + 100 X4 (JP-8 + 100 AND JP-8 + 100 X4 W/ BETZ/DEARBORN/8Q462)
 TEST DURATION 28 DAYS AT SPECIFIED TEMPERATURES (° F)

D H K / U D R I

TEST PLAN I.D.No	AIRCRAFT USE	MILITARY MATERIAL DESIGNATION	TYPE MATERIAL	OVERALL TEST EVALUATION RESULTS & TEST STATUS														
				160/180 ° F			200 ° F			250 / 275 ° F			325 ° F			400 ° F		
				JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4
I.L.M.24 (I.M.20)	Eng. Fuel Line & Components	17-4 PH Stainless Steel AMS 5604c	Ferrous (S.S.)										CN	W	W			
I.L.M.25	Eng. Fuel Line & Components	IN 200 Nickel	Nickel				CN	W	W				CN	W	W			
I.L.M.26	Eng. Fuel lines & Components	Augmentor Spray Bar	Stainless Steel Nr,Ci,Co,Au Braze Nozzles										CN	W	W			
I.L.M.27 (I.M.34)	Eng. Fuel lines & Components	Monel 400, Sheet	Nickel Copper										CN	W	W			
I.L.M.28	Eng. Fuel lines & Components	Incoloy 909	Ni, Co, Fe										CN	W	W			
I.L.M.29	Eng. Fuel lines & Components	Titanium 6-2-4-2 (4919C) Sheet	Titanium										CN	W	W			
I.L.M.30	Eng. Fuel lines & Components	Haynes 188	Co, Cr, Ni										CN	W	W			
I.L.M.31	Eng. Fuel lines & Components	Haynes 214	Ni, Cr, Fe, Al										NT	NT	NT			
I.L.M.32.1	Eng. Fuel lines & Components	AMS 7902B AlBeMet 162 Reactive Material Sheet & Plate, Beryllium Alloy	.1) as cast alloy (310)										CN	W	W			
I.L.M.32.2			.2) investment cast high strength alloy with machined surfaces (157)										CN	W	W			
I.L.M.32.3			.3) AM 162 rolled Standard grind finish										CN	W	W			
I.L.M.33	Eng. Fuel lines & Components	UNS C17200 Be Cu Spring	Cu, Be										CN	W	W			

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FUEL / MATERIAL TEST RESULT SUMMARY TABLE
 JP-8, JP-8 + 100 AND JP 8 + 100 X4 (JP-8 + 100 AND JP-8 + 100 X4 W/ BETZ/DEARBORN/8Q462)
 TEST DURATION 28 DAYS AT SPECIFIED TEMPERATURES (° F)

D H K / U D R I

TEST PLAN I.D.No	AIRCRAFT USE	MILITARY MATERIAL DESIGNATION	TYPE MATERIAL	OVERALL TEST EVALUATION RESULTS & TEST STATUS														
				160/180 ° F			200/225 ° F			250 / 275 ° F			325 ° F			400 ° F		
				JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4
ILM.34	Eng. Fuel lines & Components	DB Inconel 718 Diffusion Bonded	Ni,Cr										CN	W	W	NT	NT	NT
ILM.35	Eng. Fuel lines & Components	SIC Reinforced Ti, MMC	Titanium, MMC										CN	W	W			
ILM.36	Eng. Fuel lines & Components	Ti-8Al-1Mo-1V	Titanium										CN	W	W			
ILM.37	Eng. Fuel lines & Components	Ion Vapor Deposit IVD onto 4130	4130 Steel, Fe, Cr, Mo										CN	W	W			
ILM.38	Eng. Fuel lines & Components	52100 AMS644H	Steel										NT	NT	NT			
ILM.39	Eng. Fuel lines & Components	8620 AMS6277E	Steel										NT	NT	NT			
ILM.40	Eng. Fuel lines & Components	303 Stainless	Steel										CN	W	W			
ILM.41	Eng. Fuel lines & Components	TI-CP-70	Titanium										CN	W	W			

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F U E L / M A T E R I A L T E S T R E S U L T S U M M A R Y T A B L E
 JP-8, JP-8 + 100 AND JP 8 + 100 X4 (JP-8 + 100 AND JP-8 + 100 X4 W/ BETZ/DEARBORN/8Q462)
 T E S T D U R A T I O N 2 8 D A Y S A T S P E C I F I E D T E M P E R A T U R E S (° F)

D H K / U D R I

TEST PLAN I.D.No	AIRCRAFT USE	MILITARY MATERIAL DESIGNATION	TYPE MATERIAL	OVERALL TEST EVALUATION RESULTS & TEST STATUS														
				160/180 ° F			200/225 ° F			250 / 275 ° F			325 ° F			400 ° F		
				JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4
I.O.1	Float	Buna-N	Unicellular Buna-N				/W	/W	/W									
I.O.2	Float	Foam	Polyurethane Unicellular				/W	/W	/W									
I.O.3	Float	Foam, Sample #1	Polyurethane				/W	/W	/W									
I.O.4	Float	Foam, Sample #2	Polyurethane				/W	/W	/W									
I.O.5	Float	Foam, Sample #3	Polyurethane				/W	/W	/W									
I.O.6	Float	Foam, Sample #4	Polyurethane				/W	/W	/W									
I.O.7	Float	Foam					/W	/W	/W									
I.O.8	Float	Cork	Cork				W/	W/	W/									

K E Y T O S Y M B O L S

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 TEST DURATION 28 DAYS AT SPECIFIED TEMPERATURES (° F)

D H K / U D R I

TEST PLAN I.D.No	AIRCRAFT USE	MILITARY MATERIAL DESIGNATION	TYPE MATERIAL	OVERALL TEST EVALUATION RESULTS & TEST STATUS														
				160/180 ° F			200 ° F			250 / 275 ° F			325 ° F			400 ° F		
				JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4
I.P.1	Potting Compound	Unmodified Epoxy (See I.A.5)	Epoxy				W	W	W									
I.P.2.1	Potting Compound	Polysulfide Film	Polysulfide Film				O	O	O									
I.P.2.2			Electrical Connector Application				O	O	O									
I.P.3	Potting Compound	AMS 3361, Fluorosilicon	Fluorosilicon				NT	NT	NT									
I.P.4	Potting Compound	Urethane	Urethane				NT	NT	NT									

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7 Day Test Results

TEST PLAN I.D. No.	AIRCRAFT USE	MILITARY MATERIAL DESIGNATION	TYPE MATERIAL	OVERALL TEST EVALUATION RESULTS & TEST STATUS														
				160/180 ° F			200 ° F			250 / 275 ° F			325 ° F			400 ° F		
				JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4	JP8	+100	x4
I.B.4	Bladder tank	Innerliner	Nitrile				W	OT	OT									
I.B.5	Bladder Tank	Innerliner	Polyurethane				OT	W	OT									
I.C.2	Int. Tank Coating	Coating, MIL-C-17725	Polyurethane				W	W	W									
I.D.2	Int. Tank Sealant	MIL-S-8802	Manganese				O	O	W									
I.E.1	Int. Fuel Tank Composite	AS 4/3501-6	Epoxy Graphite				W	W	W									
I.E.2	Int. Fuel Tank Composite	IM 7/5250-(bmi)	Graphie Bismaliemide				W	W	W									
I.F.3	ESM Foam, Fuel Tank	Foam, Yelloew Type II, MIL-b- 83054	Polyurethane Ester				W	W	W									
I.F.4	ESM Foam, Fuel Tank	Foam, Blue Type IV. MIL-B- 83054	Polyurethane Ether				W	W	W									
I.F.5	ESM Foam, Fuel Gank	MIL-F-87260 Foam ESM Class 1 Gray Charcoal	Polyurethane Ether				W	W	W									
I.G.2	Gasket	“O” Ring MIL-P-25732	Nitrile				OT	OT	OT									
I.G.6	Gasket	“O” Ring MIL-R-83248	Fluorocarbon				W	W	W									
II.G.2	Gasket	“O” Ring MIL-R-25988	Fluorosilicone										OT	W	W			
II.G.3	Gasket	“O” Ring MIL-R-83485	Fluorosilicone										O	W	W			
II.G.7	Gasket	“O” Ring MIL-R-25988	Fluorosilicone										OT	OT	W			

¹ Tested as a coating (tape adhesion and pencil)

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IX. TEST RESULT DATA SHEETS
(28 Days / 7 Days)

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	I.A.1	MATERIAL / IDENTITY:	ADHESIVE, EPOXY POLYAMIDE
TEST TEMPERATURE (°F)	200	USE:	AIRFRAME, FUEL TANKS, INTEGRAL
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	BETZ DEARBORN 8Q462 (Normal & x4 Concentrations)/93 POSF 2980
TEST DATE START:	21 APR 95	JP-8 BASELINE FUEL:	93 POSF 2980 +(JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)	4628	4591	4635	4590	30%				+1	+.02	+1	W	W	W
COHESION (%)	100	100	100	100		100%			P	P	P	W	W	W
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (STRESSED) 200°F 7 DAYS						EVALUATION OF TEST RESULTS				
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		SPECIFICATION RANGE FOR JP-8		GENERAL OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.002	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	2	4.8	4.4	2.8	9.6	8.6		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.037	0	.038	0	.018			NE	NE	NE
CONDUCTIVITY pS/m @72°F	447	597	876	108	39	248	131	912	410	150	600	W	W	O
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF: S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.A.2</u>	MATERIAL / IDENTITY:	<u>ADHESIVE, PHENOLIC</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL TANKS, INTEGRAL</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>BETZ DEARBORN 8Q462 (Normal & x4 Concentrations)/93POSF 2980</u>
TEST DATE START:	<u>21 APR 95</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 +(JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)	2932	2982	3188	3755	30%				-22	-21	-15	W	W	W
COHESION (%)	100	100	100	100		100%			P	P	P	W	W	W
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (STRESSED) 200°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.002	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	2	4.8	4.4	2.8	9.6	8.6		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.037	0	.038	0	.018			NE	NE	NE
CONDUCTIVITY pS/m @72°F	448	602	865	108	39	248	131	912	410	150	600	W	W	O
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO. TEST TEMPERATURE (°F) EXPOSURE TIME (DAYS) TEST DATE START:	I.A.3 160 28 11 MAY 95	MATERIAL / IDENTITY: USE: TEST ADDITIVE/FUEL: JP-8 BASELINE FUEL:	ADHESIVE, NITRILE, MOD. EPOXY AIRFRAME, FUEL TANK INTEGRAL Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980 93 POSF 2980 + (JP-8 Additives)
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MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)	5573	5503	5463	5233	30%				+6%	+5%	+4%	W	W	W
COHESION (%)	100	100	100	100		100%			P	P	P	W	W	W
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	NE	NE	NE	NE	NE	NE			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	NE	NE	NE	NE	NE	NE		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	NE	NE	NE	NE	NE	NE		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	NE	NE	NE	NE	NE	NE			NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	NE	NE	NE	NE	NE	NE	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
 Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
 W = Within Allowable Requirement; O = Outside Allowable Requirement
 OT = Material Tested Beyond Temperature Range
 N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
 UDRI TECH: J. DUES
 UDRI ENG: B. WILT
 UDRI P.L. ENG: D.H. KALT
 A.F. AUT. W./MLSE: A. FLETCHER
 A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.A.3</u>	MATERIAL / IDENTITY:	<u>ADHESIVE, NITRILE, MOD. EPOXY</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL TANKS, INTEGRAL</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>BETZ DEARBORN 8Q462 (Normal & x4 Concentrations)/93POSF 2980</u>
TEST DATE START:	<u>21 APR 95</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 +(JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)	5072	5036	5145	4613	30%				+10	+9	+12	W	W	W
COHESION (%)	66	88	78	70		100%			F	F	F	OT	OT	OT
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (STRESSED) 200°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.002	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	2	4.8	4.4	2.8	9.6	8.6		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.037	0	.038	0	.018			NE	NE	NE
CONDUCTIVITY pS/m @72°F	446	597	873	108	39	248	131	912	410	150	600	W	W	O
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	I.A.4 / I.P.1	MATERIAL / IDENTITY:	ADHESIVE, MOD. HI TEMP EPOXY
TEST TEMPERATURE (°F)	200	USE:	AIRFRAME, FUEL TANKS, INTEGRAL
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	BETZ DEARBORN 8Q462 (Normal & x4 Concentrations)/93POSF 2980
TEST DATE START:	21 APR 95	JP-8 BASELINE FUEL:	93 POSF 2980 +(JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
				CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)	2949	2880	3208	3195	30%				-8	-10	+4	W	W	W
COHESION (%)	100	100	100	100		100%			P	P	P	W	W	W
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (STRESSED) 200°F 7 DAYS										
	JP-8 POST	JP-8 +100 POST	JP8+100 (X4) POST	JP-8		JP-8 + 100		JP-8 + 100 x4		SPECIFICATION RANGE FOR JP-8		GENERAL OBSERVATIONS		
				PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.002	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	2	4.8	4.4	2.8	9.6	8.6		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.037	0	.038	0	.018			NE	NE	NE
CONDUCTIVITY pS/m @72°F	454	692	861	108	39	248	131	912	410	150	600	W	O	O
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF: S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	I.A.5	MATERIAL / IDENTITY:	ADHESIVE, EPON UN. MOD. EPOXY
TEST TEMPERATURE (°F)	200	USE:	AIRFRAME, FUEL TANKS, INTEGRAL
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	BETZ DEARBORN 8Q462 (Normal & x4 Concentrations)/93POSF 2980
TEST DATE START:	21 APR 95	JP-8 BASELINE FUEL:	93 POSF 2980 +(JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
				CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)	3659	3884	3851	4294	30%				-15	-9.5	-10	W	W	W
COHESION (%)	100	100	100	100		100%			P	P	P	W	W	W
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (STRESSED) 200°F 7 DAYS						EVALUATION OF TEST RESULTS				
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		SPECIFICATION RANGE FOR JP-8		GENERAL OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.002	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	2	4.8	4.4	2.8	9.6	8.6		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.037	0	.038	0	.018			NE	NE	NE
CONDUCTIVITY pS/m @72°F	447	588	861	108	39	248	131	912	410	150	600	W	W	O
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF: S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	I.A.6	MATERIAL / IDENTITY:	ADHESIVE, PRIMER, NITRILE MOD. EPOXY
TEST TEMPERATURE (°F)	200	USE:	AIRFRAME, FUEL TANKS, INTEGRAL
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	BETZ DEARBORN 8Q462 (Normal & x4 Concentrations)/93POSF 2980
TEST DATE START:	21 APR 95	JP-8 BASELINE FUEL:	93 POSF 2980 +(JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)	5083	4765	4762	5010	30%				+2	-5	-5	W	W	W
COHESION (%)	100	100	100	100		100%			P	P	P	W	W	W
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (STRESSED) 200°F 7 DAYS						EVALUATION OF TEST RESULTS				
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		SPECIFICATION RANGE FOR JP-8		GENERAL OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.002	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	2	4.8	4.4	2.8	9.6	8.6		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.037	0	.038	0	.018			NE	NE	NE
CONDUCTIVITY pS/m @72°F	454	669	873	108	39	248	131	912	410	150	600	W	O	O
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF: S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.A.7</u>	MATERIAL / IDENTITY:	<u>ADHESIVE, PRIMER, SCOTCHWELD</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL TANKS, INTEGRAL</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>BETZ DEARBORN 8Q462 (Normal & x4 Concentrations)/93POSF 2980</u>
TEST DATE START:	<u>13 DEC 94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 +(JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)	2788	2671	2653	3132	30%				-11	-15	-15	W	W	W
COHESION (%)	100	100	100	100		100%			P	P	P	W	W	W
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (STRESSED) 200°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.002	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	2	4.8	4.4	2.8	9.6	8.6		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.037	0	.038	0	.018			NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	108	39	248	131	912	410	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.A.9 / I.C.1</u>	MATERIAL / IDENTITY:	<u>ADHESIVE/COATING MIL-S-4383,3M NITRILE (ESM FOAM ADHESIVE)</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL TANKS, ESM (FOAM)</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>BETZ DEARBORN 8Q462 (Normal & x4 Concentrations)/93POSF 2980</u>
TEST DATE START:	<u>20 JUL 95</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 +(JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
				CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL	4B	4B	6B	2H		3B			P	P	P	W	W	W
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)	F	P	P	P		P			F	P	P	O	W	W
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (STRESSED) 200°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.002	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	2	4.8	4.4	2.8	9.6	8.6		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.037	0	.038	0	.018			NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	108	39	248	131	912	410	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>1A.10</u>	MATERIAL / IDENTITY:	<u>ADHESIVE, ACRYLIC</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL TANKS, INTEGRAL</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /92 POSF 2926</u>
TEST DATE START:	<u>8 OCT 97</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)	1087	919	761	3468	30%				-69%	-74%	-78%	O	O	O
COHESION (%)	90	78	83	55		100%			F	F	F	O	O	O
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.001	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	.6	.8	4.4	2.6	9.6	8.6		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.001	.002	0	.038	0	.018			NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	100	66	248	131	912	410	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.A.11.1</u>	MATERIAL / IDENTITY:	<u>ADHESIVE, FILLED EPOXY (1:1 MIX)</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, INTEGRAL FUEL TANK</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /92 POSF 2926</u>
TEST DATE START:	<u>1 SEP 97</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)	4112	4568	4322	5327	30%				-23%	-14%	-19%	W	W	W
COHESION (%)	100	100	100	100		100%			P	P	P	W	W	W
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.001	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	.6	.8	4.4	2.6	9.6	8.6		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.001	.002	0	.038	0	.018			NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	100	66	248	131	912	410	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
 Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
 W = Within Allowable Requirement; O = Outside Allowable Requirement
 OT = Material Tested Beyond Temperature Range
 N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
 UDRI TECH: J.DUES
 UDRI ENG: B. WILT
 UDRI P.I. ENG: D.H. KALT
 A.F. AUT. W/MLSE: A. FLETCHER
 A.F. AUT. WL/POSF: S.A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.A.11.2</u>	MATERIAL / IDENTITY:	<u>ADHESIVE, FILLED EPOXY (2:1 MIX)</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, INTEGRAL FUEL TANK</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /92 POSF 2926</u>
TEST DATE START:	<u>3 SEP 97</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD’S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg.2 specm’s)														
LAP SHEAR (PSI)	4552	4478	4434	4899	30%				-7%	-9%	-9%	W	W	W
COHESION (%)	100	100	100	100		100%			P	P	P	W	W	W
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.001	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	.6	.8	4.4	2.6	9.6	8.6		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.001	.002	0	.038	0	.018			NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	100	66	248	131	912	410	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color:	C =	Clear	C1 - C6 = Light to Dark
Designations:	NE =	Not Evaluated;	ND = Not Detected;
	W =	Within Allowable Requirement;	BD = Below Detection; P = Pass; F = Fail
	OT =	Material Tested Beyond Temperature Range	O = Outside Allowable Requirement
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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

DATE:	<u>23 MAR 98</u>
UDRI TECH:	<u>J. DUES</u>
UDRI ENG:	<u>B. WILT</u>
UDRI P.I. ENG:	<u>D.H. KALT</u>
A.F. AUT. W./MLSE:	<u>A. FLETCHER</u>
A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	I.B.1	MATERIAL / IDENTITY:	BLADDER TANK, NITRILE
TEST TEMPERATURE (°F)	200	USE:	AIRFRAME, FUEL TANK BLADDER INNERLINER
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	BETZ DEARBORN 8Q462 (Normal & x4 Concentrations)/93POSF 2980
TEST DATE START:	30 NOV 94	JP-8 BASELINE FUEL:	93 POSF 2980 +(JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	7791	8920	8793	7000	20%				+11%	+27%	+26%	W	W	W
ELONGATION (%)	26	30	28	46	35%				-43%	-35%	-39%	OT	W	W
VOLUME SWELL (%)	4	4	5	N/A				12%	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (STRESSED) 200°F 7 DAYS										
	JP-8 POST	JP-8 +100 POST	JP8+100 (X4) POST	JP-8 PRE POST		JP-8 + 100 PRE POST		JP-8 + 100 x4 PRE POST		SPECIFICATION RANGE		GENERAL		
										FOR JP-8		OBSERVATIONS		
										MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C1	C1	C1	C	C1	C	C1	C	C1			W	W	W
ACID NO. mgKOH/gm	.001	.001	.003	.001	.002	.001	.002	.003	.003		0.015	W	W	W
GUMS mg/100ml	2	4.6	12	2	4.8	4.4	2.8	9.6	8.6		7	W	W	NSR
HYDROPEROXIDES mM/l	.01	.003	NE	.004	.037	0	.038	0	.018			NSR	NSR	NSR
CONDUCTIVITY pS/m @72°F	41	284	447	108	39	248	131	912	410	150	600	O	W	NSR
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	I.B.2	MATERIAL / IDENTITY:	BLADDER TANK, NITRILE
TEST TEMPERATURE (°F)	200	USE:	AIRFRAME, FUEL TANK BLADDER INNERLINER
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	BETZ DEARBORN 8Q462 (Normal & x4 Concentrations)/93POSF 2980
TEST DATE START:	29 NOV 94	JP-8 BASELINE FUEL:	93 POSF 2980 +(JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	6768	7407	7464	11,750	20%				-42%	-37%	-37%	OT	W	W
ELONGATION (%)	25	25	23	32	35%				-22%	-22%	-28%	W	W	W
VOLUME SWELL (%)	-3	-5	-6	N/A				12%	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (STRESSED) 200°F 7 DAYS										
	JP-8 POST	JP-8 +100 POST	JP8+100 (X4) POST	JP-8 PRE POST		JP-8 + 100 PRE POST		JP-8 + 100 x4 PRE POST		SPECIFICATION RANGE		GENERAL		
										FOR JP-8		OBSERVATIONS		
										MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C1	C1	C1	C	C1	C	C1	C	C1			W	W	W
ACID NO. mgKOH/gm	.002	.003	.003	.001	.002	.001	.002	.003	.003		0.015	W	W	W
GUMS mg/100ml	3	5.4	13	2	4.8	4.4	2.8	9.6	8.6		7	W	W	NSR
HYDROPEROXIDES mM/l	.018	.006	.003	.004	.037	0	.038	0	.018			NSR	NSR	NSR
CONDUCTIVITY pS/m @72°F	29	316	450	108	39	248	131	912	410	150	600	O	W	NSR
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF: S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	I.B.3	MATERIAL / IDENTITY:	BLADDER TANK, POLYURETHANE
TEST TEMPERATURE (°F)	200	USE:	AIRFRAME, FUEL TANK BLADDER INNERLINER
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	BETZ DEARBORN 8Q462 (Normal & x4 Concentrations) 93/POSF 2980
TEST DATE START:	23 NOV 94	JP-8 BASELINE FUEL:	93 POSF 2980 +(JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	1512	1693	1765	1162	20%				+30	+46	+52	W	W	W
ELONGATION (%)	225	211	201	72	35%				+213	+193	+179	W	W	W
VOLUME SWELL (%)	8.4	8.4	10	N/A				12%	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (STRESSED) 200°F 7 DAYS										
	JP-8 POST	JP-8 +100 POST	JP8+100 (X4) POST	JP-8		JP-8 + 100		JP-8 + 100 x4		SPECIFICATION RANGE FOR JP-8		GENERAL OBSERVATIONS		
				PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C1	C1	C1	C	C1	C	C1	C	C1			W	W	W
ACID NO. mgKOH/gm	.001	.001	.002	.001	.002	.001	.002	.003	.003		0.015	W	W	W
GUMS mg/100ml	11.6	15.2	22.8	2	4.8	4.4	2.8	9.6	8.6		7	O	O	NSR
HYDROPEROXIDES mM/l	.011	.004	.004	.004	.037	0	.038	0	.018			W	W	W
CONDUCTIVITY pS/m @72°F	13	127	371	108	39	248	131	912	410	150	600	O	O	NSR
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.B.4</u>	MATERIAL / IDENTITY:	<u>BLADDER TANK, NITRILE</u>
TEST TEMPERATURE (°F)	<u>160</u>	USE:	<u>AIRFRAME, FUEL TANK BLADDER INNERLINER</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>BETZ DEARBORN 8Q462 (Normal & x4 Concentrations) 93/POSF 2980</u>
TEST DATE START:	<u>23 JUL 96</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 +(JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	2128	2225	2128	2441	50%				-13	-9	-13	W	W	W
ELONGATION (%)	398	389	399	568	35%				-30	-32	-30	W	W	W
VOLUME SWELL (%)	-3	-1	-3	N/A				12%	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (STRESSED) 160°F 7 DAYS										
	JP-8 POST	JP-8 +100 POST	JP8+100 (X4) POST	JP-8		JP-8 + 100		JP-8 + 100 x4		SPECIFICATION RANGE FOR JP-8		GENERAL OBSERVATIONS		
				PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	NE	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	.6	NE	4.4	5.2	9.6	12.4		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.001	NE	0	.001	0	ND			NE	NE	NE
CONDUCTIVITY pS/m @ 72°F	161	457	663	100	NE	248	NE	912	NE	150	600	W	W	NSR
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.B.4</u>	MATERIAL / IDENTITY:	<u>BLADDER TANK, NITRILE</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL TANK BLADDER INNERLINER</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>BETZ DEARBORN 8Q462 (Normal & x4 Concentrations) 93/POSF 2980</u>
TEST DATE START:	<u>9 JUN 94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 +(JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	1647	1799	1887	2441	50%				-33	-26	-23	W	W	W
ELONGATION (%)	113	94	111	568	35%				-80	-83	-80	OT	OT	OT
VOLUME SWELL (%)	-4	-5	-5	N/A				12%	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (STRESSED) 200°F 7 DAYS										
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		SPECIFICATION RANGE FOR JP-8		GENERAL OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NSR
ACID NO. mgKOH/gm	NE	NE	NE	.001	.002	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	2	4.8	4.4	2.8	9.6	8.6		7	NE	NE	NSR
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.037	0	.038	0	.018			NE	NE	NSR
CONDUCTIVITY pS/m @72°F	187	529	769	103	39	248	131	912	410	150	600	W	W	NSR
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF: S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.B.5</u>	MATERIAL / IDENTITY:	<u>BLADDER TANK, POLYURETHANE</u>
TEST TEMPERATURE (°F)	<u>160</u>	USE:	<u>AIRFRAME, FUEL TANK BLADDER INNERLINER</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>BETZ DEARBORN 8Q462 (Normal & x4 Concentrations) 93/POSF 2980</u>
TEST DATE START:	<u>29 MAY 96</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 +(JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	2082	2025	1979	3292	50%				-37%	-38%	-40%	W	W	W
ELONGATION (%)	545	512	515	449	35%				+21%	+14%	+15%	W	W	W
VOLUME SWELL (%)	10	23	17	N/A				12%	P	F	F	W	O	O
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (STRESSED) 160°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	NE	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	.6	NE	4.4	5.2	9.6	12.4		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.001	NE	0	.001	0	ND			NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	100	NE	248	NE	912	NE	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
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A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	I.B.5	MATERIAL / IDENTITY:	BLADDER TANK, POLYURETHANE
TEST TEMPERATURE (°F)	200	USE:	AIRFRAME, FUEL TANK BLADDER INNERLINER
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	BETZ DEARBORN 8Q462 (Normal & x4 Concentrations)/93POSF 2980
TEST DATE START:	9 JUN 94	JP-8 BASELINE FUEL:	93 POSF 2980 +(JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	2217	2134	2177	3292	50%				-33%	-35%	-34%	W	W	W
ELONGATION (%)	567	540	529	449	35%				+26%	+20%	+18%	W	W	W
VOLUME SWELL (%)	17	28	29	N/A				12%	F	F	F	OT	OT	OT
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (STRESSED) 200°F 7 DAYS										
	JP-8 POST	JP-8 +100 POST	JP8+100 (X4) POST	JP-8 PRE POST		JP-8 + 100 PRE POST		JP-8 + 100 x4 PRE POST		SPECIFICATION RANGE		GENERAL		
										FOR JP-8		OBSERVATIONS		
										MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NSR
ACID NO. mgKOH/gm	NE	NE	NE	.001	.002	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	2	4.8	4.4	2.8	9.6	8.6		7	NE	NE	NSR
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.037	0	.038	0	.018			NE	NE	NSR
CONDUCTIVITY pS/m @ 72°F	129	243	532	108	39	248	131	912	410	150	600	O	W	O
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.B.7</u>	MATERIAL / IDENTITY:	<u>BLADDER TANK, NITRILE</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL TANK BLADDER INNERLINER</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>BETZ DEARBORN 8Q462 (Normal & x4 Concentrations) 93/POSF 2980</u>
TEST DATE START:	<u>9 FEB 95</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 +(JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	1674	1609	1652	2416	50%				-31%	-33%	-32%	W	W	W
ELONGATION (%)	124	134	144	459	35%				-73%	-71%	-69%	OT	OT	OT
VOLUME SWELL (%)	5	5	5	N/A				12%	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (STRESSED) 200°F 7 DAYS										
	JP-8 POST	JP-8 +100 POST	JP8+100 (X4) POST	JP-8 PRE POST		JP-8 + 100 PRE POST		JP-8 + 100 x4 PRE POST		SPECIFICATION RANGE		GENERAL		
										FOR JP-8		OBSERVATIONS		
										MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NSR
ACID NO. mgKOH/gm	.001	.003	.003	.001	.002	.001	.002	.003	.003		0.015	W	W	W
GUMS mg/100ml	2.8	5.2	11.4	2	4.8	4.4	2.8	9.6	8.6		7	W	W	NSR
HYDROPEROXIDES mM/l	.015	.012	.011	.004	.037	0	.038	0	.018			O	W	NSR
CONDUCTIVITY pS/m @72°F	466	802	940	108	39	248	131	912	410	150	600	W	O	NSR
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.B.8</u>	MATERIAL / IDENTITY:	<u>BLADDER TANK, URETHANE</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL TANK BLADDER INNERLINER</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>BETZ DEARBORN 8Q462 (Normal & x4 Concentrations)/POSF 2980</u>
TEST DATE START:	<u>14 FEB 95</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 +(JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	5881	5821	6219	5878	50%				0%	-1%	+6%	W	W	W
ELONGATION (%)	362	362	394	276	35%				+31%	+31%	+43%	W	W	W
VOLUME SWELL (%)	13	12	12	N/A				12%	F	P	P	OT	W	W
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (STRESSED) 200°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NSR
ACID NO. mgKOH/gm	NE	.001	.002	.001	.002	.001	.002	.003	.003		0.015	NE	W	W
GUMS mg/100ml	NE	6.4	13.4	2	4.8	4.4	2.8	9.6	8.6		7	NE	W	NSR
HYDROPEROXIDES mM/l	NE	.026	.015	.004	.037	0	.038	0	.018			NE	NSR	NSR
CONDUCTIVITY pS/m @72°F	NE	594	836	108	39	248	131	912	410	150	600	NE	W	NSR
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.B.11</u>	MATERIAL / IDENTITY:	<u>BLADDER TANK, NYLON</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL TANK BLADDER , STRUCTURAL CLOTH</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>BETZ DEARBORN 8Q462 (Normal & x4 Concentrations) 93/POSF 2980</u>
TEST DATE START:	<u>21 NOV 95</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 +(JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	90	91	94	85	20%				+6%	+7%	+11%	W	W	W
ELONGATION (%)	17	17	19	19	35%				-11%	-11%	0%	W	W	W
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (STRESSED) 200°F 7 DAYS										
	JP-8 POST	JP-8 +100 POST	JP8+100 (X4) POST	JP-8		JP-8 + 100		JP-8 + 100 x4		SPECIFICATION RANGE FOR JP-8		GENERAL OBSERVATIONS		
				PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NSR
ACID NO. mgKOH/gm	NE	NE	NE	.001	.001	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	.6	.8	4.4	2.8	9.6	8.6		7	NE	NE	NSR
HYDROPEROXIDES mM/l	NE	NE	NE	.001	.002	0	.038	0	.018			NE	NE	NSR
CONDUCTIVITY pS/m @72°F	NE	NE	NE	100	66	248	131	912	410	150	600	NE	NE	NSR
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.B.12</u>	MATERIAL / IDENTITY:	<u>BLADDER TANK, POLYESTER</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL TANK BLADDER , STRUCTURAL CLOTH</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>BETZ DEARBORN 8Q462 (Normal & x4 Concentrations) 93/POSF 2980</u>
TEST DATE START:	<u>21 NOV 95</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 +(JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	147	152	149	153	20%				-4%	-1%	-3%	W	W	W
ELONGATION (%)	15	14	14	16	35%				-6%	-13%	-13%	W	W	W
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (STRESSED) 200°F 7 DAYS										
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		SPECIFICATION RANGE FOR JP-8		GENERAL OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NSR
ACID NO. mgKOH/gm	NE	NE	NE	.001	.001	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	.6	.8	4.4	2.8	9.6	8.6		7	NE	NE	NSR
HYDROPEROXIDES mM/l	NE	NE	NE	.001	.002	0	.038	0	.018			NE	NE	NSR
CONDUCTIVITY pS/m @72°F	NE	NE	NE	100	66	248	131	912	410	150	600	NE	NE	NSR
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.B.13</u>	MATERIAL / IDENTITY:	<u>NYLON CLOTH</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL SYSTEM, FUEL TANK BLADDER</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /92 POSF 2926</u>
TEST DATE START:	<u>7 JAN 97</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	78	91	94	98	20%				-20%	-7%	-4%	W	W	W
ELONGATION (%)	15	17	17	31	35				-52%	-45%	-45%	OT	W	W
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)				C	C1	C	C1	C	C1					
ACID NO. mgKOH/gm				.001	.001	.001	.002	.003	.003		0.015			
GUMS mg/100ml				.6	.8	4.4	2.8	9.6	8.6		7			
HYDROPEROXIDES mM/l				.001	.002	0	.032	0	.018					
CONDUCTIVITY pS/m @72°F				100	66	248	131	912	410	150	600			
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>IB.14</u>	MATERIAL / IDENTITY:	<u>NYLON CLOTH</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL SYSTEM, FUEL TANK BLADDER STRUCTURE</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /92 POSF 2926</u>
TEST DATE START:	<u>7 JAN 97</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	90	104	106	106	20%				-15%	-2%	0%	W	W	W
ELONGATION (%)	14	14	13	15	35				-7%	-7%	-13%	W	W	W
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)				C	C1	C	C1	C	C1					
ACID NO. mgKOH/gm				.001	.001	.001	.002	.003	.003		0.015			
GUMS mg/100ml				.6	.8	4.4	2.8	9.6	8.6		7			
HYDROPEROXIDES mM/l				.001	.002	0	.032	0	.018					
CONDUCTIVITY pS/m @72°F				100	66	248	131	912	410	150	600			
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>IB.15</u>	MATERIAL / IDENTITY:	<u>NITRILE</u>
TEST TEMPERATURE (°F)	<u>AMBIENT</u>	USE:	<u>AIRFRAME, SELF SEALING BLADDER TANK, F-15</u>
EXPOSURE TIME (DAYS)	<u>N/A</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /92 POSF 2926</u>
TEST DATE START:	<u>6 JULY 98</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD’S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm’s)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS	O	O	NE		O				P	P	NE	W	W	NE

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	NE	NE	NE	NE	NE	NE			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	NE	NE	NE	NE	NE	NE		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	NE	NE	NE	NE	NE	NE		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	NE	NE	NE	NE	NE	NE			NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	NE	NE	NE	NE	NE	NE	150	600	NE	NE	NE
VISUAL OBSERVATIONS	NE	NE	NE	NE	NE	NE	NE	NE	NE			NE	NE	NE

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.B.16</u>	MATERIAL / IDENTITY:	<u>POLYURETHANE</u>
TEST TEMPERATURE (°F)	<u>AMBIENT</u>	USE:	<u>AIRFRAME, SELF SEALING BLADDER TANK, F-15</u>
EXPOSURE TIME (DAYS)	<u>N/A</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /92 POSF 2926</u>
TEST DATE START:	<u>6 JULY 98</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS						
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION			
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4	
	POST	POST	POST												
TENSILE (PSI)															
ELONGATION (%)															
VOLUME SWELL (%)															
HARD’S; a) SHORE A (PTS)															
b) PENCIL															
COMP. SET (avg. 2 specm’s)															
LAP SHEAR (PSI)															
COHESION (%)															
TAPE ADHESION (P/F)															
PEEL STRENGTH (LB/IN)															
LAMINAR SHEAR (PSI)															
RESISTIVITY (OHM-CM)															
TORQUE (INCH -LBS.)															
RUPTURE PRESS. (IN.HG)															
VISUAL OBSERVATIONS	W	W	NE			O				P	P	NE	W	W	NE

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	NE	NE	NE	NE	NE	NE			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	NE	NE	NE	NE	NE	NE		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	NE	NE	NE	NE	NE	NE		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	NE	NE	NE	NE	NE	NE			NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	NE	NE	NE	NE	NE	NE	150	600	NE	NE	NE
VISUAL OBSERVATIONS	NE	NE	NE	NE	NE	NE	NE	NE	NE			NE	NE	NE

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 4 AUG 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.C.1 / I.A.9</u>	MATERIAL / IDENTITY:	<u>MIL-S-4383 NITRILE</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, INTEGRAL FUEL TANK COATING</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>BETZ DEARBORN 8Q462 (Normal & x4 Concentrations)/93 POSF 2980</u>
TEST DATE START:	<u>22 JUN 95</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 +(JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE RESULTS			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	JP-8 POST	JP-8 +100 POST	JP8+100 (X4) POST	CONTROL MAT	ALLOWABLE TOLERANCE				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
				MEASURED AT AMBIENT TEMP	REQUIREMENT				JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
					DECREASE	MIN VALUE	INCREASE	MAX VALUE						
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL	4B	4B	6B	2H		3B			P	P	P	W	W	W
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)	F	P	P	P		P			F	P	P	O	W	W
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (STRESSED) 200°F 7 DAYS						EVALUATION OF TEST RESULTS				
	JP-8 POST	JP-8 +100 POST	JP8+100 (X4) POST	JP-8		JP-8 + 100		JP-8 + 100 x4		SPECIFICATION RANGE FOR JP-8		GENERAL OBSERVATIONS		
				PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1	NSR	NSR	NE	NE	NSR
ACID NO. mgKOH/gm	NE	NE	NE	.001	.001	.001	.002	.003	.003	NSR	0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	.6	.8	4.4	2.8	9.6	8.6	NSR	7	NE	NE	NSR
HYDROPEROXIDES mM/l	NE	NE	NE	.001	.002	0	.038	0	.018	NSR	NSR	NE	NE	NSR
CONDUCTIVITY pS/m @72°F	NE	NE	NE	100	66	248	131	912	410	150	600	NE	NE	NSR
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
 Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
 W = Within Allowable Requirement; O = Outside Allowable Requirement
 OT = Material Tested Beyond Temperature Range
 N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
 UDRI TECH: J. DUES
 UDRI ENG: B. WILT
 UDRI P.I. ENG: D.H. KALT
 A.F. AUT. W/MLSE: A. FLETCHER
 A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.C.2</u>	MATERIAL / IDENTITY:	<u>MIL-C-27725, POLYURETHANE</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, INTEGRAL FUEL TANK COATING</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>BETZ DEARBORN 8Q462 (Normal & x4 Concentrations)/93 POSF 2980</u>
TEST DATE START:	<u>22 NOV 94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 +(JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE RESULTS			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	JP-8 POST	JP-8 +100 POST	JP8+100 (X4) POST	CONTROL MAT	ALLOWABLE TOLERANCE				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
				MEASURED AT	REQUIREMENT				JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
				AMBIENT TEMP	DECREASE	MIN VALUE	INCREASE	MAX VALUE						
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL	>6H	>6H	>6H	>6H	0				P	P	P	W	W	W
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)	P	P	P	P		P			P	P	P	W	W	W
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (STRESSED) 200°F 7 DAYS						SPECIFICATION RANGE GENERAL				
	JP-8 POST	JP-8 +100 POST	JP8+100 (X4) POST	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
				PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1	NSR	NSR	NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.002	.001	.002	.003	.003	NSR	0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	2	4.8	4.4	2.8	9.6	8.6	NSR	7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.037	0	.038	0	.018	NSR	NSR	NE	NE	NE
CONDUCTIVITY pS/m @72°F	26	430	320	108	39	248	131	912	410	150	600	O	W	NSR
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.C.3</u>	MATERIAL / IDENTITY:	<u>EPOXY</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, INTEGRAL FUEL TANK COATING</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>22 NOV 94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL	>6H	>6H	>6H	>6H	0				P	P	P	W	W	W
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)	P	P	P	P		P			P	P	P	W	W	W
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS *	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1	NSR	NSR	NE	NE	NSR
ACID NO. mgKOH/gm	NE	NE	NE	.001	.002	.001	.002	.003	.003	NSR	0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	2	4.8	4.4	2.8	9.6	8.6	NSR	7	NE	NE	NSR
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.037	0	.038	0	.018	NSR		NE	NE	NSR
CONDUCTIVITY pS/m @72°F	NE	NE	NE	108	39	248	131	912	410	150	600	NE	NE	NSR
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF: S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>LC.4/I.D.2</u>	MATERIAL / IDENTITY:	<u>MANGANESE, MIL-S-8802F</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, INTEGRAL FUEL TANK COATING/SEALANT</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>9 JUN 94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA				EVALUATION OF TEST RESULTS						
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	313	373	361	395		200			P	P	P	W	W	W
ELONGATION (%)	193	183	198	271		150%			P	P	P	W	W	W
VOLUME SWELL (%)	-15	-5	-5	N/A				8%	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	55	56	55	53		40Pts			P	P	P	W	W	W
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)	100	100	100	N/A		100%			P	P	P	W	W	W
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)	23	23	21	N/A		20			P	P	P	W	W	W
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1	NSR	NSR	NE	NE	NSR
ACID NO. mgKOH/gm	NE	NE	NE	.001	.002	.001	.002	.003	.003	NSR	0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	2	4.8	4.4	2.8	9.6	8.6	NSR	7	NE	NE	NSR
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.037	0	.038	0	.018	NSR		NE	NE	NSR
CONDUCTIVITY pS/m @72°F	NE	NE	NE	108	39	248	131	912	410	150	600	NE	NE	NSR
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.C.5</u>	MATERIAL / IDENTITY:	<u>PRE/COAT, POLYURETHANE</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, INTEGRAL FUEL TANK COATING</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>BETZ DEARBORN 8Q462 (Normal & x4 Concentrations)/ 93 POSF 2980</u>
TEST DATE START:	<u>5 JUN 95</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 +(JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT	ALLOWABLE TOLERANCE				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)	MEASURED AT	REQUIREMENT				JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
	POST	POST	POST	AMBIENT TEMP	DECREASE	MIN VALUE	INCREASE	MAX VALUE						
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL	>6H	>6H	>6H	>6H	0				P	P	P	W	W	W
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)	P	P	P	P		P			P	P	P	W	W	W
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL						SPECIFICATION RANGE				
	4 X 7 DAY PERIODS (28 DAYS)			PRE (NEW) VS. POST (STRESSED) 200°F 7 DAYS						FOR JP-8		GENERAL OBSERVATIONS		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		MIN	MAX	JP8	+100	X4
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST					
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1	NSR	NSR	NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.002	.001	.002	.003	.003	NSR	0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	.6	.8	4.4	2.8	9.6	8.6	NSR	7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.001	.002	0	.038	0	.018	NSR	NSR	NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	100	66	248	131	912	410	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	LC6	MATERIAL / IDENTITY:	A-36 LAP WELD, EPOXY POLYAMIDE PAINT MIL-P-14441 TYPE III
TEST TEMPERATURE (°F)	120	USE:	GROUND BULK FUEL STORAGE
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	BETZ DEARBORN 8Q462 (Normal & x4 Concentrations)/ 92 POSF 2926
TEST DATE START:	29 JULY 98	JP-8 BASELINE FUEL:	92 POSF 2926 +(JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE RESULTS			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	JP-8 POST	JP-8 +100 POST	JP8+100 (X4) POST	CONTROL MAT	ALLOWABLE TOLERANCE				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
				MEASURED AT	REQUIREMENT				JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
				AMBIENT TEMP	DECREASE	MIN VALUE	INCREASE	MAX VALUE						
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL	>6H	>6H	>6H	>6H		>6H			P	P	P	W	W	W
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)	P	P	P	P		P			P	P	P	W	W	W
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS	P	P	P	P		P			P	P	P	W	W	W

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (STRESSED) 200°F 7 DAYS						EVALUATION OF TEST RESULTS				
	JP-8 POST	JP-8 +100 POST	JP8+100 (X4) POST	JP-8		JP-8 + 100		JP-8 + 100 x4		SPECIFICATION RANGE FOR JP-8		GENERAL OBSERVATIONS		
				PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)														
ACID NO. mgKOH/gm											0.015			
GUMS mg/100ml											7			
HYDROPEROXIDES mM/l														
CONDUCTIVITY pS/m @72°F										150	600			
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 10 SEPT 98
UDRI TECH: J. DUES
UDRI ENG: S. SALIBA
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>LC6</u>	MATERIAL / IDENTITY:	<u>A-36 LAP WELD, EPOXY POLYAMIDE PAINT MIL-P-14441 TYPE III</u>
TEST TEMPERATURE (°F)	<u>120</u>	USE:	<u>GROUND BULK FUEL STORAGE</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>BETZ DEARBORN 8Q462 (Normal & x4 Concentrations)/ 92 POSF 2926</u>
TEST DATE START:	<u>29 JULY 98</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 +(JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		REQUIREMENT									
	POST	POST	POST	DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4	
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD’S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm’s)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
TABER ABRADER Abraded gms/1000 cyc.	0.087	0.055	0.062	0.085				0.090	P	P	P	W	W	W

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (STRESSED) 200°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)														
ACID NO. mgKOH/gm											0.015			
GUMS mg/100ml											7			
HYDROPEROXIDES mM/l														
CONDUCTIVITY pS/m @72°F										150	600			
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
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Between Material Degradation and Fuel Properties Degradation

DATE: 10 SEPT 98
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A.F. AUT. WL/POSF: S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	I.D.1	MATERIAL / IDENTITY:	MIL-S-8802F, DICROMATE
TEST TEMPERATURE (°F)	200	USE:	AIRFRAME, INTEGRAL FUEL TANK SEALANT
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /92 POSF 2926
TEST DATE START:	11 JUL 95	JP-8 BASELINE FUEL:	92 POSF 2926 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	323	324	348	518		200 PSI			P	P	P	W	W	W
ELONGATION (%)	323	307	375	507		150%			P	P	P	W	W	W
VOLUME SWELL (%)	1	0	1	N/A				8%	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	49	59	55	62		30 Pts			P	P	P	W	W	W
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)	100	100	100	N/A		100%			P	P	P	W	W	W
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)	40	41	42	N/A		20 lb/in			P	P	P	W	W	W
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1	NSR	NSR	NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.001	.001	.002	.003	.003	NSR	0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	.6	.8	4.4	2.8	9.6	8.6	NSR	7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.001	.002	0	.038	0	.018	NSR	NSR	NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	100	66	248	131	912	410	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
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Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF: S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>ID.2/I.C.4</u>	MATERIAL / IDENTITY:	<u>MIL-S-8802, MANGANESE</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, INTEGRAL FUEL TANK SEALANT/COATING</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>9 JUN '94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	313	373	361	395	%	200PSI			P	P	P	W	W	W
ELONGATION (%)	193	183	198	271		150%			P	P	P	W	W	W
VOLUME SWELL (%)	-15	-5	-5	N/A				8%	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	55	56	55	53		30 Pts			P	P	P	W	W	W
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)	100	100	100	N/A		100%			P	P	P	W	W	W
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)	23	23	21	N/A		20 lb/in			P	P	P	W	W	W
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) 200 °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.002	.001	.002	.003	.003	NSR	0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	2	4.8	4.4	2.8	9.6	8.6		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.037	0	.038	0	.018			NE	NE	NE
CONDUCTIVITY pS/m @72°F	25	293	460	108	39	248	131	912	410	150	600	O	W	NSR
VISUAL OBSERVATIONS														

NOTES:

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Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.D.3</u>	MATERIAL / IDENTITY:	<u>MANGANESE, MIL-S-8340A</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, INTEGRAL FUEL TANK SEALANT</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>17 NOV 94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	338	394	351	394		200 PSI			P	P	P	W	W	W
ELONGATION (%)	194	212	187	288		150%			P	P	P	W	W	W
VOLUME SWELL (%)	-6	-6	-7	N/A				8%	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	53	55	55	54		30 Pts			P	P	P	W	W	W
b) PENCIL														
COMP. SET (avg. 2 spc m's)														
LAP SHEAR (PSI)														
COHESION (%)	100	100	100	N/A		100%			P	P	P	W	W	W
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)	29	28	27	N/A		20 lb/in			P	P	P	W	W	W
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C2	C2	C2	C	C1	C	C1	C	C1	NSR	NSR	NE	NE	NE
ACID NO. mgKOH/gm	.002	.011	.014	.001	.002	.001	.002	.003	.003	NSR	0.016	NE	NE	NE
GUMS mg/100ml	15.2	43.6	45.8	2	4.8	4.4	2.8	9.6	8.6	NSR	7	O	O	NSR
HYDROPEROXIDES mM/l	.019	0	0	.004	.037	0	.038	0	.018	NSR	NSR	W	W	W
CONDUCTIVITY pS/m @72°F	30	259	460	108	39	248	131	912	410	150	600	O	W	NSR
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

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DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.D.5</u>	MATERIAL / IDENTITY:	<u>PRIMER, FLOUROSILICONE</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, INTEGRAL FUEL TANK SEALANT</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>4 SEP 95</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	511	453	609	643		200 PSI			P	P	P	W	W	W
ELONGATION (%)	290	265	336	355		150%			P	P	P	W	W	W
VOLUME SWELL (%)	-13	-19	-24	N/A				8%	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	45	44	66	45		40 Pts			P	P	P	W	W	W
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)	100	100	100	N/A		100%			P	P	P	W	W	W
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)	17	20	22	N/A		10 lb/in			P	P	P	W	W	W
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1	NSR	NSR	NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.001	.001	.002	.003	.003	NSR	0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	.6	.8	4.4	2.8	9.6	8.6	NSR	7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.001	.002	0	.038	0	.018	NSR	NSR	NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	100	66	248	131	912	410	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
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DATE: 23 MAR 98
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UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.D.6</u>	MATERIAL / IDENTITY:	<u>POLYURETHANE, SPRAY SEALANT, AMS 3279</u>
TEST TEMPERATURE (°F)	<u>160</u>	USE:	<u>AIRFRAME, INTEGRAL FUEL TANK SEALANT</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /92 POSF 2926</u>
TEST DATE START:	<u>2 APR 98</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)	100	100	100	NE		100			P	P	P	W	W	W
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)	20	14	16			12			P	P	P	W	W	W
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	NE	NE	NE	NE	NE	NE			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	NE	NE	NE	NE	NE	NE		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	NE	NE	NE	NE	NE	NE		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	NE	NE	NE	NE	NE	NE			NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	NE	NE	NE	NE	NE	NE	150	600	NE	NE	NE
VISUAL OBSERVATIONS	NE	NE	NE	NE	NE	NE	NE	NE	NE			NE	NE	NE

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 4 AUG 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.D.6</u>	MATERIAL / IDENTITY:	<u>POLYURETHANE, SPRAY SEALANT, AMS 3279</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, INTEGRAL FUEL TANK SEALANT</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>29 DEC 95</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	247	214	265	451		200 PSI			P	P	P	W	W	W
ELONGATION (%)	620	532	702	863		150%			P	P	P	W	W	W
VOLUME SWELL (%)	14	12	14	N/A				15%	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	56	52	55	67		40 Pts			P	P	P	W	W	W
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1	NSR	NSR	NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.001	.001	.002	.003	.003	NSR	0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	.6	.8	4.4	2.8	9.6	8.6	NSR	7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.001	.002	0	.038	0	.018	NSR	NSR	NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	100	66	248	131	912	410	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.D.7</u>	MATERIAL / IDENTITY:	<u>POLYTHIOETHER, SEALANT, AMS 3277</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, INTEGRAL FUEL TANK, SEALANT</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>18 NOV 94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	324	309	295	338		125			P	P	P	W	W	W
ELONGATION (%)	215	194	213	323		100			P	P	P	W	W	W
VOLUME SWELL (%)	6	7	5	N/A				25	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	40	40	40	48		30			P	P	P	W	W	W
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)	100	100	100	N/A		100			P	P	P	W	W	W
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)	40	44	50	N/A		20			P	P	P	W	W	W
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)				C	C1	C	C1	C	C1					
ACID NO. mgKOH/gm				.001	.002	.001	.002	.003	.003		0.015			
GUMS mg/100ml				2	4.8	4.4	2.8	9.6	8.6		7			
HYDROPEROXIDES mM/l				.004	.037	0	.038	0	.018					
CONDUCTIVITY pS/m @72°F				108	39	248	131	912	410	150	600			
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	I.D.8	MATERIAL / IDENTITY:	POLYSULFIDE, AMS 3281
TEST TEMPERATURE (°F)	160	USE:	AIRFRAME, INTEGRAL FUEL TANK SEALANT
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	17 JUN 96	JP-8 BASELINE FUEL:	92 POSF 2926 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	229	241	244	266		200 PSI			P	P	P	W	W	W
ELONGATION (%)	409	386	386	596		150%			P	P	P	W	W	W
VOLUME SWELL (%)	6	5	5	N/A				8%	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	47	47	49	38		30 Pts			P	P	P	W	W	W
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)	100	100	94	N/A		100%			P	P	F	W	W	O
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)	38	37	31	N/A		20 lb/in			P	P	P	W	W	W
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1	NSR	NSR	NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	NE	.001	.002	.003	.003	NSR	0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	.6	NE	4.4	5.2	9.6	12.4	NSR	7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.001	NE	0	.01	0	ND	NSR	NSR	NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	100	NE	242	NE	912	NE	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	I.D.8	MATERIAL / IDENTITY:	POLYSULFIDE, AMS 3281
TEST TEMPERATURE (°F)	200	USE:	AIRFRAME, INTEGRAL FUEL TANK SEALANT
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	13 JUL 95	JP-8 BASELINE FUEL:	92 POSF 2926 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	151	151	158	266		200 PSI			F	F	F	OT	OT	OT
ELONGATION (%)	555	615	576	596		150%			P	P	P	W	W	W
VOLUME SWELL (%)	8	8	7	N/A				8%	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	28	24	27	38		30 Pts			F	F	F	OT	OT	OT
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)	100	100	100	N/A		100%			P	P	P	W	W	W
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)	28	31	30	N/A		20 lb/in			P	P	P	W	W	W
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1	NSR	NSR	NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.001	.001	.002	.003	.003	NSR	0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	.6	.8	4.4	2.8	9.6	8.6	NSR	7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.001	.002	0	.038	0	.018	NSR	NSR	NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	100	66	248	131	912	410	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.D.9</u>	MATERIAL / IDENTITY:	<u>POLYSULFIDE, AMS 3265</u>
TEST TEMPERATURE (°F)	<u>160</u>	USE:	<u>AIRFRAME, INTEGRAL FUEL TANK SEALANT</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>4 JUL 96</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	435	452	464	370		200 PSI			P	P	P	W	W	W
ELONGATION (%)	326	309	315	420		150%			P	P	P	W	W	W
VOLUME SWELL (%)	-2	-2	-2	N/A				8%	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	60	59	61	52		30 Pts			P	P	P	W	W	W
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)	100	100	94	N/A		100%			P	P	F	W	W	O
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)	40	41	40	N/A		20 lb/in			P	P	P	W	W	W
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	C1	C1	C	C1	C	C1	C	C1	NSR	NSR	NE	W	W
ACID NO. mgKOH/gm	NE	.004	.004	.001	NE	.001	.002	.003	.003	NSR	0.015	NE	W	W
GUMS mg/100ml	NE	6.4	14.8	.6	NE	4.4	5.2	9.6	12.4	NSR	7	NE	W	NS R
HYDROPEROXIDES mM/l	NE	NE	NE	.001	NE	0	.01	0	ND	NSR	NSR	NE	W	W
CONDUCTIVITY pS/m @72°F	NE	365	662	100	NE	242	NE	912	NE	150	600	NE	W	O
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J.DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF: S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.D.9</u>	MATERIAL / IDENTITY:	<u>POLYSULFIDE, AMS 3265</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, INTEGRAL FUEL TANK SEALANT</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>12 JUL 95</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	310	414	410	370		200 PSI			P	P	P	W	W	W
ELONGATION (%)	136	152	156	432		150%			F	P	P	OT	W	W
VOLUME SWELL (%)	-12	-11	-13	N/A				8%	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	72	73	76	52		30 Pts			P	P	P	W	W	W
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)	100	100	100	N/A		100%			P	P	P	W	W	W
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)	15	16	15	N/A		20 lb/in			F	F	F	OT	OT	OT
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1	NSR	NSR	NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.001	.001	.002	.003	.003	NSR	0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	.6	.8	4.4	2.8	9.6	8.6	NSR	7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.001	.002	0	.038	0	.018	NSR	NSR	NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	100	66	248	131	912	410	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>LD.10</u>	MATERIAL / IDENTITY:	<u>POLYSULFIDE, SEALANT, AMS 3283</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, INTEGRAL FUEL TANK SEALANT</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>5 JUN 96</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)	0	4	7	N/A				8%	P	P	P	W	W	W
HARD’S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm’s)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)	15.6	19.9	18.7	10.4		3.5 “Hg			P	P	P	W	W	W
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1	NSR	NSR	NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.001	.001	.002	.003	.003	NSR	0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	.6	.8	4.4	2.8	9.6	8.6	NSR	7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.001	.002	0	.038	0	.018	NSR	NSR	NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	100	66	248	131	912	410	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>LD.11</u>	MATERIAL / IDENTITY:	<u>FLOUROSILICONE, MIL-S-85334</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, INTEGRAL FUEL TANK SEALANT</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>28 JUN 95</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)	12	13	13	N/A				12%	P	F	F	W	W	W
HARD’S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm’s)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)	33.90	39.67	36.20	35.13		3.5 “Hg			P	P	P	W	W	W
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1	NSR	NSR	NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.001	.001	.002	.003	.003	NSR	0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	.6	.8	4.4	2.8	9.6	8.6	NSR	7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.001	.002	0	.038	0	.018	NSR	NSR	NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	100	66	248	131	912	410	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.E.1</u>	MATERIAL / IDENTITY:	<u>AS4 / 3501-6 EPOXY GRAPHITE</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, INTEGRAL FUEL TANK, COMPOSITE</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/De arborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>9 JUN 94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)	9267	9792	9625	11,141	20%				-17	-12	-14	W	W	W
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
BUBBLE PT,IN H2O														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1	NSR	NSR	NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.002	.002	.003	.003	.003	NSR	0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	2	4.8	4.4	2.8	9.6	8.6	NSR	7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.037	0	.038	0	.018	NSR	NSR	NE	NE	NE
CONDUCTIVITY pS/m @72°F	45	153	375	108	39	248	131	912	410	150	600	O	W	W
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	I.E.2	MATERIAL / IDENTITY:	IM7 /5250-4 (BMI) GRAPHIE BISMALIEMIDE
TEST TEMPERATURE (°F)	200	USE:	AIRFRAME, INTEGRAL FUEL TANK, COMPOSITE
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	9 JUN 94	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)	10,950	12,000	12,330	12,330	20%				-12	-3	0	W	W	W
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
BUBBLE PT,IN H2O														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1	NSR	NSR	NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.002	.001	.002	.003	.003	NSR	0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	2	4.8	4.4	2.8	9.6	8.6	NSR	7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.037	0	.032	0	.018	NSR	NSR	NE	NE	NE
CONDUCTIVITY pS/m @72°F	55	161	392	108	39	248	131	912	410	150	600	O	W	W
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.E.3</u>	MATERIAL / IDENTITY:	<u>AS-7 / 8551-7A EPOXY GRAPHITE</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, INTEGRAL FUEL TANK, COMPOSITE</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>1 Dec 94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS						
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION			
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4	
	POST	POST	POST												
TENSILE (PSI)															
ELONGATION (%)															
VOLUME SWELL (%)															
HARD’S; a) SHORE A (PTS)															
b) PENCIL															
COMP. SET (avg. 2 spec’s)															
LAP SHEAR (PSI)															
COHESION (%)															
TAPE ADHESION (P/F)															
PEEL STRENGTH (LB/IN)															
LAMINAR SHEAR (PSI)	11,190	10,710	11,470	11,220	20%					-3	-5	+2	W	W	W
RESISTIVITY (OHM-CM)															
TORQUE (INCH -LBS.)															
RUPTURE PRESS. (IN.HG)															
BUBBLE PT,IN H2O															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1	NSR	NSR	NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.002	.001	.002	.003	.003	NSR	0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	2	4.8	4.4	2.8	9.6	8.6	NSR	7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.037	0	.032	0	.018	NSR	NSR	NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	108	39	248	131	912	410	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	LF.1.1	MATERIAL / IDENTITY:	F-100 ENGINE FUEL FILTER
TEST TEMPERATURE (°F)	250	USE:	ENGINE FUEL FILTER F-100 ENGINE (P&W)
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /92 POSF 2926
TEST DATE START:	18 NOV 97	JP-8 BASELINE FUEL:	92 POSF 2926 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD’S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm’s)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
BUBBLE PT,IN H2O	3.8		4.0	£3.3” H2O		3.3			P		P	W		W

FUELS PROPERTY TESTS *	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) *F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)				C	C1	C	C1	C	C1					
ACID NO. mgKOH/gm				.001	.001	.001	.002	.003	.003		0.015			
GUMS mg/100ml				.6	.8	4.4	2.8	9.6	8.6		7			
HYDROPEROXIDES mM/l				.001	.002	0	.032	0	.018					
CONDUCTIVITY pS/m @72°F				100	66	248	131	912	410	150	600			
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF: S.A. ANDERSON

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists

Between Material Degradation and Fuel Properties Degradation

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>1.F.1.2</u>	MATERIAL / IDENTITY:	<u>F-110 ENGINE FUEL FILTER</u>
TEST TEMPERATURE (°F)	<u>250</u>	USE:	<u>ENGINE, FUEL FILTER F-110 (GE)</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /92 POSF 2926</u>
TEST DATE START:	<u>18 NOV 97</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
BUBBLE PT,IN H2O	3.5		4.0	£3.3” H2O		3.3			P		P	W		W

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)				C	C1	C	C1	C	C1					
ACID NO. mgKOH/gm				.001	.001	.001	.002	.003	.003		0.015			
GUMS mg/100ml				.6	.8	4.4	2.8	9.6	8.6		7			
HYDROPEROXIDES mM/l				.001	.002	0	.032	0	.018					
CONDUCTIVITY pS/m @72°F				100	66	248	131	912	410	150	600			
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF: S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO. <u>LF.2</u> TEST TEMPERATURE (°F) <u>250</u> EXPOSURE TIME (DAYS) <u>28</u> TEST DATE START: <u>14 AUG 97</u>	MATERIAL / IDENTITY: <u>T700 HELICOPTER ENGINE FUEL FILTER</u> USE: <u>ENGINE FUEL FILTER, T700 HELICOPTER</u> TEST ADDITIVE/FUEL: <u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /92 POSF 2926</u> JP-8 BASELINE FUEL: <u>92 POSF 2926 + (JP-8 Additives)</u>	
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MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
BUBBLE PT,IN H2O	4.4		4.8	³4.2"H2O			4.2			P		P	W	W
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS										
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		SPECIFICATION RANGE		GENERAL		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	FOR JP-8		OBSERVATIONS		
COLOR (7 DAYS)				C	C1	C	C1	C	C1					
ACID NO. mgKOH/gm				.001	.001	.001	.002	.003	.003		0.015			
GUMS mg/100ml				.6	.8	4.4	2.8	9.6	8.6		7			
HYDROPEROXIDES mM/l				.001	.002	0	.032	0	.018					
CONDUCTIVITY pS/m @72°F				100	66	248	131	912	410	150	600			
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
 Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
 W = Within Allowable Requirement; O = Outside Allowable Requirement
 OT = Material Tested Beyond Temperature Range
 N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
 UDRI TECH: J. DUES
 UDRI ENG: B. WILT
 UDRI P.L. ENG: D.H. KALT
 A.F. AUT. W./MLSE: A. FLETCHER
 A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	LF.3	MATERIAL / IDENTITY:	YELLOW TYPE II, POLYESTER, MIL-B-83054
TEST TEMPERATURE (°F)	200	USE:	AIRFRAME, FUEL TANK ESM (FOAM) POLYURETHANE
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	BETZ DEARBORN 8Q462 (Normal and x4 Concentrations)/93 POSF 2980
TEST DATE START:	9 JUN '94	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	14	13	14	16	45%				-13	-19	-13	W	W	W
ELONGATION (%)	296	280	283	274	40%				+8	+2	+3	W	W	W
VOLUME SWELL (%)														
HARD’S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spec’s)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)	NE	NE	NE	NE										
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) 200°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1	NSR	NSR	NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.002	.001	.002	.003	.003	NSR	0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	2	4.8	4.4	2.8	9.6	8.6	NSR	7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.037	0	.038	0	.018	NSR	NSR	NE	NE	NE
CONDUCTIVITY pS/m @72°F	33	258	337	108	39	248	131	912	410	150	600	O	W	W
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>LF.4</u>	MATERIAL / IDENTITY:	<u>BLUE TYPE IV, POLYETHER, MIL-B-83054</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL TANK ESM (FOAM) POLYURETHANE</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>BETZ DEARBORN 8Q462 (Normal and x4 Concentrations)/93 POSF 2980</u>
TEST DATE START:	<u>9 JUN '94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	9	8	9	9	45%				0	-11	0	W	W	W
ELONGATION (%)	103	113	132	115	40%				-10	-2	+15	W	W	W
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 specm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)	NE	NE	NE	NE										
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) 200°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1	NSR	NSR	NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.002	.001	.002	.003	.003	NSR	0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	2	4.8	4.4	2.8	9.6	8.6	NSR	7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.037	0	.038	0	.018	NSR	NSR	NE	NE	NE
CONDUCTIVITY pS/m @72°F	105	304	470	108	39	248	131	912	410	150	600	O	W	W
VISUAL OBSERVATIONS														

NOTES:

Fuel Color:	C =	Clear	C1 - C6 = Light to Dark
Designations:	NE =	Not Evaluated;	ND = Not Detected;
	W =	Within Allowable Requirement;	BD = Below Detection; P = Pass; F = Fail
	OT =	Material Tested Beyond Temperature Range	O = Outside Allowable Requirement
	N/A =	Not applicable;	NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

DATE:	<u>23 MAR 98</u>
UDRI TECH:	<u>J. DUES</u>
UDRI ENG:	<u>B. WILT</u>
UDRI P.L. ENG:	<u>D.H. KALT</u>
A.F. AUT. W./MLSE:	<u>A. FLETCHER</u>
A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>LF.5</u>	MATERIAL / IDENTITY:	<u>GRAY CLASS 1, POLYESTER, MIL-F-87260</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL TANK ESM (FOAM) POLYURETHANE</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>9 JUN 94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS						
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION			
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4	
	POST	POST	POST												
TENSILE (PSI)	11	11	11	15	45%				-27	-27	-27	W	W	W	
ELONGATION (%)	87	92	85	118	40				-26	-22	-28	W	W	W	
VOLUME SWELL (%)															
HARD'S; a) SHORE A (PTS)															
b) PENCIL															
COMP. SET (avg. 2 spcm's)															
LAP SHEAR (PSI)															
COHESION (%)															
TAPE ADHESION (P/F)															
PEEL STRENGTH (LB/IN)															
LAMINAR SHEAR (PSI)															
RESISTIVITY (OHM-CM)	3.92E11	3.98E11	3.06E11	1.29E11				1.0E12	P	P	P	W	W	W	
TORQUE (INCH -LBS.)															
RUPTURE PRESS. (IN.HG)															
VISUAL OBSERVATIONS															
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL											
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS											
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4							
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	FOR JP-8		GENERAL OBSERVATIONS			
										MIN	MAX	JP8	+100	X4	
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1	NSR	NSR	NE	NE	NE	
ACID NO. mgKOH/gm	NE	NE	NE	.001	.002	.001	.002	.003	.003	NSR	0.015	NE	NE	NE	
GUMS mg/100ml	NE	NE	NE	2	4.8	4.4	2.8	9.6	8.6	NSR	7	NE	NE	NE	
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.037	0	.038	0	.018	NSR	NSR	NE	NE	NE	
CONDUCTIVITY pS/m @72°F	112	289	494	108	39	248	131	912	410	150	600	O	W	W	
VISUAL OBSERVATIONS															

NOTES:

Fuel Color:	C =	Clear	C1 - C6 = Light to Dark
Designations:	NE =	Not Evaluated;	ND = Not Detected;
	W =	Within Allowable Requirement;	BD = Below Detection; P = Pass; F = Fail
	OT =	Material Tested Beyond Temperature Range	O = Outside Allowable Requirement
	N/A =	Not applicable;	NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

DATE:	<u>23 MAR 98</u>
UDRI TECH:	<u>J. DUES</u>
UDRI ENG:	<u>B. WILT</u>
UDRI P.I. ENG:	<u>D.H. KALT</u>
A.F. AUT. W/MLSE:	<u>A. FLETCHER</u>
A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>LF.6</u>	MATERIAL / IDENTITY:	<u>GREY CLASS II, POLYESTER, MIL-F-87260</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL TANK ESM (FOAM) POLYURETHANE</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>27 FEB 96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	8	8	8	14	45%				-43	-43	-43	W	W	W
ELONGATION (%)	96	89	90	146	40%				-34	-39	-38	W	W	W
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)	4.75E11	5.43E11	7.82E11	2.45E11				1.0E12	P	P	P	W	W	W
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1	NSR	NSR	NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.001	.001	.002	.003	.003	NSR	0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	.6	.8	4.4	2.8	9.6	8.6	NSR	7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.001	.02	0	.038	0	.018	NSR	NSR	NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	100	66	248	131	912	410	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO. TEST TEMPERATURE (°F) EXPOSURE TIME (DAYS) TEST DATE START:	LF.9 160 28 28 MAY 98	MATERIAL / IDENTITY: USE: TEST ADDITIVE/FUEL: JP-8 BASELINE FUEL:	BEIGE, TYPE II CHARACTERISTICS POLYESTER, URETHANE AIRFRAME, FUEL TANK ESM (FOAM) Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /92 POSF 2926 92 POSF 2926 + (JP-8 Additives)
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MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	17	17	14	24	45				-29%	-29%	-42%	W	W	W
ELONGATION (%)	396	389	390	369	40				+7%	+3%	+2%	W	W	W
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)	4.75E11	5.43E11	7.82E11	2.45E11				1.0E12	P	P	P	W	W	W
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)														
ACID NO. mgKOH/gm											0.015			
GUMS mg/100ml											7			
HYDROPEROXIDES mM/l														
CONDUCTIVITY pS/m @72°F										150	600			
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
 Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
 W = Within Allowable Requirement; O = Outside Allowable Requirement
 OT = Material Tested Beyond Temperature Range
 N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

DATE: 24 MAR 98
 UDRI TECH: J. DUES
 UDRI ENG: B. WILT
 UDRI P.I. ENG: D.H. KALT
 A.F. AUT. W./MLSE: A. FLETCHER
 A.F. AUT. WL/POSF: S. A. ANDERSON

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.G.1</u>	MATERIAL / IDENTITY:	<u>NITRILE, MIL-P-83461 (HYDRAULIC)</u>
TEST TEMPERATURE (°F)	<u>160</u>	USE:	<u>AIRFRAME, FUEL SYSTEM GASKETS, "O" - RINGS</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>BETZ DEARBORN 8Q462 (Normal & x4 Concentrations)/93POSF 2980</u>
TEST DATE START:	<u>23 JAN 96</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 +(JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	413	1145	1192	1532	25%				-73	-25	-22	O	W	W
ELONGATION (%)	78	148	160	159	25%				-51	-7	+1	O	W	W
VOLUME SWELL (%)	15	14	15	N/A		0%		25%	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	68	65	62	74	5 PTS		5 PTS		-6	-9	-12	O	O	O
b) PENCIL														
COMP. SET (avg. 2 spcm's)	10	16	12	N/A				50%	P	P	P	W	W	W
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (STRESSED) 160°F 7 DAYS						SPECIFICATION RANGE		GENERAL OBSERVATIONS		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8				
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	NE	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	.6	NE	4.4	5.2	9.6	12.4		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.001	NE	0	.001	0	ND			NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	100	NE	248	NE	912	NE	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF: S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.G.1</u>	MATERIAL / IDENTITY:	<u>NITRILE, MIL-P-83461 (HYDRAULIC)</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL SYSTEM GASKETS, "O" - RINGS</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>BETZ DEARBORN 8Q462 (Normal & x4 Concentrations)/93POSF 2980</u>
TEST DATE START:	<u>24 NOV 94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 +(JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		REQUIREMENT				JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
	POST	POST	POST		DECREASE	MIN VALUE	INCREASE	MAX VALUE						
TENSILE (PSI)	245	745	910	1532	25%				-84	-51	-40	O	O	O
ELONGATION (%)	32	100	117	159	25%				-80	-37	-26	O	O	O
VOLUME SWELL (%)	13	14	14	N/A		0%		25%	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	79	69	70	74	5 PTS		5 PTS		+5	-5	-4	W	W	W
b) PENCIL														
COMP. SET (avg. 2 spcm's)	30	39	46	N/A				50%	P	P	P	W	W	W
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (STRESSED) 160°F 7 DAYS										
										SPECIFICATION RANGE		GENERAL		
				JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.002	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	2	4.8	4.4	2.8	9.6	8.6		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.037	0	.038	0	.018			NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	108	39	248	131	912	410	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF: S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.G.2</u>	MATERIAL / IDENTITY:	<u>NITRILE, MIL-P-25732 (HYDRAULIC)</u>
TEST TEMPERATURE (°F)	<u>160</u>	USE:	<u>AIRFRAME, FUEL SYSTEM GASKETS, "O" - RINGS</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>BETZ DEARBORN 8Q462 (Normal & x4 Concentrations)/POSF 2980</u>
TEST DATE START:	<u>26 DEC 95</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2926 +(JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		REQUIREMENT				JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
	POST	POST	POST		DECREASE	MIN VALUE	INCREASE	MAX VALUE						
TENSILE (PSI)	1061	921	854	1489	25%				-29	-38	-43	O	O	O
ELONGATION (%)	152	141	132	188	25%				-19	-25	-30	W	W	O
VOLUME SWELL (%)	16	15	14	N/A		0%		25%	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	67	67	67	74	5 PTS		5 PTS		-7	-7	-7	O	O	O
b) PENCIL														
COMP. SET (avg. 2 spcm's)	26	26	29	N/A				50%	P	P	P	W	W	W
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (STRESSED) 160°F 7 DAYS										
										SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	NE	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	.6	NE	4.4	5.2	9.6	12.4		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.001	NE	0	.001	0	ND			NE	NE	NE
CONDUCTIVITY pS/m @ 72°F	NE	NE	NE	100	NE	248	NE	912	NE	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF: S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.G.2</u>	MATERIAL / IDENTITY:	<u>NITRILE, MIL-P-25732 9HYDRAULIC)</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL SYSTEM GASKETS, "O" - RINGS</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>BETZ DEARBORN 8Q462 (Normal & x4 Concentrations)/93POSF 2980</u>
TEST DATE START:	<u>9 JUN 94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 +(JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
				CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE				COMPARISON TO CONTROL & ALLOWABLE REQ UIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		REQUIREMENT				JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
	POST	POST	POST		DECREASE	MIN VALUE	INCREASE	MAX VALUE						
TENSILE (PSI)	743	801	1043	1489	25%				-50	-46	-30	O	O	O
ELONGATION (%)	95	99	115	188	25%				-49	-47	-39	O	O	O
VOLUME SWELL (%)	12	12	12	N/A		0%		25%	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	71	71	70	74	5 PTS		5 PTS		-3	-3	-4	W	W	W
b) PENCIL														
COMP. SET (avg. 2 spcm's)	54	63	63	N/A				50%	F	F	F	O	O	O
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (STRESSED) 160°F 7 DAYS										
										SPECIFICATION RANGE		GENERAL		
				JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.002	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	2	4.8	4.4	2.8	9.6	8.6		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.037	0	.038	0	.018			NE	NE	NE
CONDUCTIVITY pS/m @72°F	15	207	507	108	39	248	131	912	410	150	600	O	W	W
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.G.3</u>	MATERIAL / IDENTITY:	<u>NITRILE, MIL-P-5315</u>
TEST TEMPERATURE (°F)	<u>160</u>	USE:	<u>AIRFRAME, FUEL SYSTEM GASKETS, "O" - RINGS</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>BETZ DEARBORN 8Q462 (Normal & x4 Concentrations)/93POSF 2980</u>
TEST DATE START:	<u>15 FEB 96</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 +(JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		REQUIREMENT				JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
	POST	POST	POST		DECREASE	MIN VALUE	INCREASE	MAX VALUE						
TENSILE (PSI)	1009	1528	1592	1783	25%				-43	-14	-11	O	W	W
ELONGATION (%)	199	199	202	309	25%				-36	-36	-35	O	W	W
VOLUME SWELL (%)	16	17	17	N/A		0%		25%	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	57	65	65	68	5 PTS		5 PTS		-11	-3	-3	O	W	W
b) PENCIL														
COMP. SET (avg. 2 spcm's)	9	12	6	N/A				50%	P	P	P	W	W	W
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (S TRESSED) 160°F 7 DAYS										
										SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	.004	.004	.001	NE	.001	.002	.003	.003		0.015	NE	W	W
GUMS mg/100ml	NE	4.4	41.4	.6	NE	4.4	5.2	9.6	12.4		7	NE	W	O
HYDROPEROXIDES mM/l	NE	0	0	.001	NE	0	.01	0	ND			NE	W	W
CONDUCTIVITY pS/m @72°F	15	400	662	100	NE	248	NE	912	NE	150	600	O	W	NSR
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.G.3</u>	MATERIAL / IDENTITY:	<u>NITRILE MIL-P-5315</u>
TEST TEMPERATURE (°F)	<u>180</u>	USE:	<u>AIRFRAME, FUEL SYSTEM GASKETS, "O" - RINGS</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>BETZ DEARBORN 8Q462 (Normal & x4 Concentrations)/POSF 2980</u>
TEST DATE START:	<u>14 MAR 96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2926 +(JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	1163	1093	1320	1712	25%				-32	-36	-23	OT	OT	W
ELONGATION (%)	232	222	187	264	25%				-12	-16	-29	W	W	OT
VOLUME SWELL (%)	18	16	17	N/A		0%		25%	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	55	56	62	66	5 PTS		5 PTS		-11	-10	-4	OT	OT	W
b) PENCIL														
COMP. SET (avg. 2 spcm's)	19	24	25	N/A				50%	P	P	P	W	W	W
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (STRESSED) 180°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C1	C1	C1	C	C1	C	C1	C	C1			W	W	W
ACID NO. mgKOH/gm	.006	.003	.004	.001	.003	.001	.003	.003	.007		0.015	W	W	W
GUMS mg/100ml	3.2	5.4	12.4	.6	6.0	4.4	4.0	9.6	8.4		7	W	W	O
HYDROPEROXIDES mM/l	.37	0	0	.001	ND	0	.022	0	.00			O	W	W
CONDUCTIVITY pS/m @72°F	149	376	604	100	NE	248	NE	912	NE	150	600	W	W	NSR
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.G.3</u>	MATERIAL / IDENTITY:	<u>NITRILE, MIL-P-5315</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL SYSTEM GASKETS, "O" - RINGS</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>BETZ DEARBORN 8Q462 (Normal & x4 Concentrations)/93POSF 2980</u>
TEST DATE START:	<u>21 NOV 94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 +(JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	174	991	1211	1970	25%				-91	-50	-39	OT	OT	OT
ELONGATION (%)	34	138	147	265	25%				-87	-48	-45	OT	OT	OT
VOLUME SWELL (%)	16	17	18	N/A		0%		25%	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	76	63	63	69	5 PTS		5 PTS		+7	-6	-6	OT	OT	OT
b) PENCIL														
COMP. SET (avg. 2 spcm's)	37	41	40	N/A				50%	P	P	P	W	W	W
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (STRESSED) 200°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.002	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	2	4.8	4.4	2.8	9.6	8.6		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.037	0	.038	0	.018			NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	108	39	248	131	912	410	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF: S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	I.G.3	MATERIAL / IDENTITY:	NITRILE, MIL-P-5315
TEST TEMPERATURE (°F)	325	USE:	AIRFRAME, FUEL SYSTEM GASKETS, "O"-RINGS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	16 NOV '94	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	132	(Broke)	111	1970	25%				-93	-100	-94	OT	OT	OT
ELONGATION (%)	38	(Broke)	23	265	25%				-87	-100	-92	OT	OT	OT
VOLUME SWELL (%)	19	15	15	N/A		0%		25%	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	70	82	75	69	5 PTS		5 PTS		+1	+13	+6	W	OT	OT
b) PENCIL														
COMP. SET (avg. 2 spcm's)	170	162	147	N/A				50%	F	F	F	OT	OT	OT
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C2	C2	C2	C	C2	C	C2	C	C2			W	W	W
ACID NO. mgKOH/gm	.006	.001	.006	.001	.007	.001	.006	.003	.008		0.015	W	W	W
GUMS mg/100ml	4.2	7.6	15.8	2	3	4.4	3.4	9.6	12.2		7	W	O	O
HYDROPEROXIDES mM/l	.016	NE	.011	.004	.017	0	.015	0	.008			O	NE	O
CONDUCTIVITY pS/m @72°F	10.75	99	403	108	123	248	141	912	555	150	600	W	W	W
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J.DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF: S.A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.G.4</u>	MATERIAL / IDENTITY:	<u>NITRILE, AMS 7271 / MS 9201</u>
TEST TEMPERATURE (°F)	<u>160</u>	USE:	<u>AIRFRAME, FUEL SYSTEM GASKETS, "O" - RINGS</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>BETZ DEARBORN 8Q462 (Normal & x4 Concentrations)/POSF 2980</u>
TEST DATE START:	<u>20 SEP 95</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 +(JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	1170	1085	1141	1665	40%				-30	-35	-31	W	W	W
ELONGATION (%)	226	214	229	255	20%				0	-5	-2	W	W	W
VOLUME SWELL (%)	36	36	39	N/A		0%		40%	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	58	59	58	69	12Pts		12Pts		-11	-10	-11	W	W	W
b) PENCIL														
COMP. SET (avg. 2 spcm's)	0	1	0	N/A				40%	P	P	P	W	W	W
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (STRESSED) 160°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C1	C1	C1	C	C1	C	C1	C	C1			W	W	W
ACID NO. mgKOH/gm	.018	.021	.025	.001	NE	.001	.002	.003	.003		0.015	O	O	O
GUMS mg/100ml	12.6	22.8	27.4	.6	NE	4.4	5.2	9.6	12.4		7	O	O	O
HYDROPEROXIDES mM/l	.02	.01	.005	.001	NE	0	.01	0	ND			W	W	W
CONDUCTIVITY pS/m @72°F	50	226	544	100	NE	248	NE	912	NE	150	600	O	W	W
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.G.4</u>	MATERIAL / IDENTITY:	<u>NITRILE, AMS 7271 / MS 9201</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL SYSTEM GASKETS, "O" - RINGS</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>BETZ DEARBORN 8Q462 (Normal & x4 Concentrations)/POSF 2980</u>
TEST DATE START:	<u>15 FEB 95</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2980 +(JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	563	355	507	1577	40%				-64	-77	-68	OT	OT	OT
ELONGATION (%)	231	185	207	231	20%				0	-20	-10	W	W	W
VOLUME SWELL (%)	50	49	49	N/A		0%		40%	F	F	F	OT	OT	OT
HARD'S; a) SHORE A (PTS)	43	42	46	69	12Pts		12Pts		-26	-27	-23	OT	OT	OT
b) PENCIL														
COMP. SET (avg. 2 spcm's)	54	34	37	N/A				40%	F	P	P	OT	W	W
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (STRESSED) 200°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.001	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	.6	.8	4.4	2.8	9.6	8.6		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.001	.002	0	.038	0	.018			NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	100	66	248	131	912	410	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
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A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.G.5 / IL.G.2</u>	MATERIAL / IDENTITY:	<u>FLUOROSILICONE, MIL-R-25988</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL SYSTEM GASKETS, "O" - RINGS</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>BETZ DEARBORN 8Q462 (Normal & x4 Concentrations)/93POSF 2980</u>
TEST DATE START:	<u>9 JUN 94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 +(JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		REQUIREMENT				JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
	POST	POST	POST		DECREASE	MIN VALUE	INCREASE	MAX VALUE						
TENSILE (PSI)	856	857	852	984	45%				-13%	-13%	-13%	W	W	W
ELONGATION (%)	199	201	194	195	35%				+2%	+3%	-1%	W	W	W
VOLUME SWELL (%)	9	9	9	N/A		0%		25%	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	63	63	63	69	20Pts				-2	-2	-2	W	W	W
b) PENCIL														
COMP. SET (avg. 2 spcm's)	6	9	10	N/A				30%	P	P	P	W	W	W
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (STRESSED) 200°F 7 DAYS										
										SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C1	C1	C1	C	C1	C	C1	C	C1			W	W	W
ACID NO. mgKOH/gm	.002	.002	.003	.001	.002	.001	.002	.003	.003		0.015	W	W	W
GUMS mg/100ml	3.4	5.2	14.2	2	4.8	4.4	2.8	9.6	8.6		7	W	W	W
HYDROPEROXIDES mM/l	.09	.03	0	.004	.037	0	.038	0	.018			O	W	W
CONDUCTIVITY pS/m @72°F	42	231	399	108	39	248	131	912	410	150	600	W	W	W
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF: S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	I.G.6 / IL.G.9	MATERIAL / IDENTITY:	FLUOROCARBON, MIL-R-83248
TEST TEMPERATURE (°F)	200	USE:	AIRFRAME, FUEL SYSTEM GASKETS, "O" - RINGS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	BETZ DEARBORN 8Q462 (Normal & x4 Concentrations)/POSF 2980
TEST DATE START:	9 JUN 94	JP-8 BASELINE FUEL:	93 POSF 2980 +(JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	1873	1749	1726	1823	20%				+3%	-4%	-5%	W	W	W
ELONGATION (%)	228	215	196	193	20%				+18%	+11%	+2%	W	W	W
VOLUME SWELL (%)	4	4	4	N/A		0%		10%	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	74	74	73	75	5Pts		5Pts		-1	-1	-2	W	W	W
b) PENCIL														
COMP. SET (avg. 2 spcm's)	6	6	10	N/A				60%	P	P	P	W	W	W
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (STRESSED) 200°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C2	C	C1	C	C1	C	C1	C	C1			W	W	W
ACID NO. mgKOH/gm	.002	.002	.003	.001	.002	.001	.002	.003	.003		0.015	W	W	W
GUMS mg/100ml	5.6	5.8	11.6	2	4.8	4.4	2.8	9.6	8.6		7	W	W	NSR
HYDROPEROXIDES mM/l	.031	0	.008	.004	.037	0	.038	0	.018			W	W	W
CONDUCTIVITY pS/m @72°F	25	332	491	108	39	248	131	912	410	150	600	O	W	W
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
 Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
 W = Within Allowable Requirement; O = Outside Allowable Requirement
 OT = Material Tested Beyond Temperature Range
 N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
 UDRI TECH: J. DUES
 UDRI ENG: B. WILT
 UDRI P.I. ENG: D.H. KALT
 A.F. AUT. W/MLSE: A. FLETCHER
 A.F. AUT. WL/POSF: S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.G.7 / IL.G.3</u>	MATERIAL / IDENTITY:	<u>FLUOROCARBON, MIL-R-83485</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL SYSTEM GASKETS, "O" - RINGS</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>BETZ DEARBORN 8Q462 (Normal & x4 Concentrations)/93POSF 2980</u>
TEST DATE START:	<u>9 JUN 94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 +(JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		REQUIREMENT				JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
	POST	POST	POST		DECREASE	MIN VALUE	INCREASE	MAX VALUE						
TENSILE (PSI)	1456	1446	1410	1644	20%				-11%	-12%	-14%	W	W	W
ELONGATION (%)	181	179	178	193	20%				-6%	-7%	-8%	W	W	W
VOLUME SWELL (%)	4	4	5	N/A		0%		10%	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	74	74	74	76	5Pts		5 PTS		-2	-2	-2	W	W	W
b) PENCIL														
COMP. SET (avg. 2 spcm's)	9	10	9	N/A				60%	P	P	P	W	W	W
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (STRESSED) 200°F 7 DAYS										
										SPECIFICATION RANGE		GENERAL		
				JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	.003	.003	.004	.001	.002	.001	.002	.003	.003		0.015	W	W	W
GUMS mg/100ml	3.4	5.8	12.8	2	4.8	4.4	2.8	9.6	8.6		7	W	W	O
HYDROPEROXIDES mM/l	.031	.017	NE	.004	.037	0	.038	0	.018			O	W	NE
CONDUCTIVITY pS/m @72°F	448	779	852	108	39	248	131	912	410	150	600	W	O	O
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

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DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF: S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.G.8 / II.G.4</u>	MATERIAL / IDENTITY:	<u>PERFLUOROELASTOMER, AMS 7257A</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL SYSTEM GASKETS, "O" - RINGS</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>BETZ DEARBORN 8Q462 (Normal & x4 Concentrations)/93POSF 2980</u>
TEST DATE START:	<u>26 OCT 94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 +(JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		REQUIREMENT				JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
	POST	POST	POST		DECREASE	MIN VALUE	INCREASE	MAX VALUE						
TENSILE (PSI)	2105	2060	2029	2313	20%				-9%	-11%	-12%	W	W	W
ELONGATION (%)	114	115	105	110	15%				+4%	+5%	-5%	W	W	W
VOLUME SWELL (%)	2	2	2	N/A		0%		5%	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	80	80	81	84	5 Pts		5 Pts		-4	-4	-3	W	W	W
b) PENCIL														
COMP. SET (avg. 2 spcm's)	No Test	No Test	No Test	N/A				60%	NE	NE	NE	NE	NE	NE
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (STRESSED) 200°F 7 DAYS										
										SPECIFICATION RANGE		GENERAL		
				JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	.002	.003	.005	.001	.002	.001	.002	.003	.003		0.015	W	W	W
GUMS mg/100ml	1.8	2.6	5.2	2	4.8	4.4	2.8	9.6	8.6		7	W	W	W
HYDROPEROXIDES mM/l	.014	.009	NE	.004	.037	0	.038	0	.018			O	O	NE
CONDUCTIVITY pS/m @ 72°F	457	644	855	108	39	248	131	912	410	150	600	W	O	O
VISUAL OBSERVATIONS														

NOTES:

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Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.G.9</u>	MATERIAL / IDENTITY:	<u>NITRILE, TYPE S</u>
TEST TEMPERATURE (°F)	<u>160</u>	USE:	<u>AIRFRAME, FUEL SYSTEM GASKETS, "O" - RINGS</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>BETZ DEARBORN 8Q462 (Normal & x4 Concentrations)/POSF 2980</u>
TEST DATE START:	<u>25 JAN 96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2926 +(JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		REQUIREMENT				JP-8	JP-8+100	JP-8+100 x4	JP8	+100	X4
	POST	POST	POST		DECREASE	MIN VALUE	INCREASE	MAX VALUE						
TENSILE (PSI)	1926	1704	1847	2138	25%				-10	-20	-14	W	W	W
ELONGATION (%)	256	209	229	254	25%				+1	-18	-10	W	W	W
VOLUME SWELL (%)	7	6	5	N/A		0%		25%	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	63	63	64	71	5 Pts		5 Pts		-8	-8	-7	O	W	W
b) PENCIL														
COMP. SET (avg. 2 spcm's)	9	12	9	N/A				50%	P	P	P	W	W	W
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)			CONTROL FUEL PRE (NEW) VS. POST (STRESSED) 160°F 7 DAYS										
										SPECIFICATION RANGE		GENERAL		
										FOR JP-8		OBSERVATIONS		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		MIN	MAX	JP8	+100	X4
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST					
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	NE	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	.6	NE	4.4	5.2	9.6	12.4		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.001	NE	0	.01	0	ND			NE	NE	NE
CONDUCTIVITY pS/m @ 72°F	NE	NE	NE	100	NE	248	NE	912	NE	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
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Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
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A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF: S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	I.G.9	MATERIAL / IDENTITY:	NITRILE, TYPE S
TEST TEMPERATURE (°F)	200	USE:	AIRFRAME, FUEL SYSTEM, GASKETS, "O" RING
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	16 FEB '95	JP-8 BASELINE FUEL:	92 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	415	1430	1607	2138	25%				-81	-33	-25	OT	OT	W
ELONGATION (%)	49	119	148	254	25				-81	-53	-42	OT	OT	OT
VOLUME SWELL (%)	5	3	4	N/A		0		25	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	79	74	72	71	5		5		+8	+3	+1	OT	W	W
b) PENCIL														
COMP. SET (avg. 2 spcm's)	44	38	44	N/A				50	P	P	P	W	W	W
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) 200 °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	.004	.004	.005	.001	.002	.001	.002	.003	.003		0.015	W	W	W
GUMS mg/100ml	4	5.2	12.4	2	4.8	4.4	2.8	9.6	8.6		7	W	W	O
HYDROPEROXIDES mM/l	.039	NE	.012	.004	.037	0	.032	0	.018			O	NE	NE
CONDUCTIVITY pS/m @72°F	448	950	960	108	39	248	131	912	410	150	600	W	O	O
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>LG.10/ILG.1</u>	MATERIAL / IDENTITY:	<u>FLUOROSILICONE, MIL-R-25988</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>ENGINE / AIRFRAME, FUEL SYSTEMS, GASKET / "O" RING</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>NTP</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)														
ACID NO. mgKOH/gm											0.015			
GUMS mg/100ml											7			
HYDROPEROXIDES mM/l														
CONDUCTIVITY pS/m @72°F										150	600			
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
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DATE: 23 MAR 98
UDRITECH: J.DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.G.11/IL.G.10</u>	MATERIAL / IDENTITY:	<u>URETHANE, SEAL</u>
TEST TEMPERATURE (°F)	<u>160</u>	USE:	<u>AIRFRAME / ENGINE, FUEL SYSTEM PUMP WASHER</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>11 OCT '96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS						
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION			
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4	
	POST	POST	POST												
TENSILE (PSI)															
ELONGATION (%)															
VOLUME SWELL (%)															
HARD'S; a) SHORE A (PTS)															
b) PENCIL															
COMP. SET (avg. 2 spcm's)															
LAP SHEAR (PSI)															
COHESION (%)															
TAPE ADHESION (P/F)															
PEEL STRENGTH (LB/IN)															
LAMINAR SHEAR (PSI)															
RESISTIVITY (OHM-CM)															
TORQUE (INCH -LBS.)															
RUPTURE PRESS. (IN.HG)															
VISUAL OBSERVATIONS	P	P	P	P		/P				P	P	P	W	W	W

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) 160 °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C	C	C	C	C1	C	C1	C	C1			W	W	W
ACID NO. mgKOH/gm	NE	NE	NE	.001	.002	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	2	4.8	4.4	2.8	9.6	8.6		7	NE	NE	NE
HYDROPEROXIDES Mm/l	NE	NE	NE	.004	.037	0	.032	0	.018			NE	NE	NE
CONDUCTIVITY pS/m @72°F	1138	448	811	108	39	248	131	912	410	150	600	O	W	O
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	LG.11 / ILG.10	MATERIAL / IDENTITY:	URETHANE, SEAL
TEST TEMPERATURE (°F)	200	USE:	AIRFRAME / ENGINE, FUEL SYSTEM PUMP, WASHER
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	2 JULY '96	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS						
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION			
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4	
	POST	POST	POST												
TENSILE (PSI)															
ELONGATION (%)															
VOLUME SWELL (%)															
HARD’S; a) SHORE A (PTS)															
b) PENCIL															
COMP. SET (avg. 2 spec’s)															
LAP SHEAR (PSI)															
COHESION (%)															
TAPE ADHESION (P/F)															
PEEL STRENGTH (LB/IN)															
LAMINAR SHEAR (PSI)															
RESISTIVITY (OHM-CM)															
TORQUE (INCH -LBS.)															
RUPTURE PRESS. (IN.HG)															
VISUAL OBSERVATIONS	F	F	F	F		/P				F	F	F	OT	OT	OT

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) 200 °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	.010	.014	.021	.001	.002	.001	.002	.003	.003		0.015	W	W	O
GUMS mg/100ml	4.4	7.8	16.4	2	4.8	4.4	2.8	9.6	8.6		7	W	O	O
HYDROPEROXIDES mM/l	ND	ND	ND	.004	.037	0	.032	0	.018			W	W	W
CONDUCTIVITY pS/m @72°F	NE	NE	NE	108	39	248	131	912	410	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.G.12/IL.G.11</u>	MATERIAL / IDENTITY:	<u>URETHANE, TANG</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME / ENGINE FUEL SYSTEM, PUMP TANG</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>27 AUG '96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS						
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION			
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4	
	POST	POST	POST												
TENSILE (PSI)															
ELONGATION (%)															
VOLUME SWELL (%)															
HARD’S; a) SHORE A (PTS)															
b) PENCIL															
COMP. SET (avg. 2 spec’s)															
LAP SHEAR (PSI)															
COHESION (%)															
TAPE ADHESION (P/F)															
PEEL STRENGTH (LB/IN)															
LAMINAR SHEAR (PSI)															
RESISTIVITY (OHM-CM)															
TORQUE (INCH -LBS.)															
RUPTURE PRESS. (IN.HG)															
VISUAL OBSERVATIONS	P	P	P	P	/P					P	P	P	W	W	W

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) 200°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C1	C1	C1	C	C1	C	C1	C	C1			W	W	W
ACID NO. mgKOH/gm	.004	.004	.007	.001	.002	.001	.002	.003	.003		0.015	W	W	W
GUMS mg/100ml	2.4	5.4	17.8	2	4.8	4.4	2.8	9.6	8.6		7	W	W	O
HYDROPEROXIDES mM/l	.00	.01	.02	.004	.037	0	.032	0	.018			W	W	O
CONDUCTIVITY pS/m @72°F	115	315	546	108	39	248	131	912	410	150	600	O	W	W
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
 Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
 W = Within Allowable Requirement; O = Outside Allowable Requirement
 OT = Material Tested Beyond Temperature Range
 N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
 UDRI TECH: J. DUES
 UDRI ENG: B. WILT
 UDRI P.L. ENG: D.H. KALT
 A.F. AUT. W./MLSE: A. FLETCHER
 A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	I.G.13/	See I.O.8 data	MATERIAL / IDENTITY:	CORK
TEST TEMPERATURE (°F)	200		USE:	AIRFRAME / FUEL SYSTEM GASKET
EXPOSURE TIME (DAYS)	28		TEST ADDITIVE/FUEL:	Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	27 AUG '96		JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS						
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION			
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4	
	POST	POST	POST												
TENSILE (PSI)															
ELONGATION (%)															
VOLUME SWELL (%)															
HARD'S; a) SHORE A (PTS)															
b) PENCIL															
COMP. SET (avg. 2 spcm's)															
LAP SHEAR (PSI)															
COHESION (%)															
TAPE ADHESION (P/F)															
PEEL STRENGTH (LB/IN)															
LAMINAR SHEAR (PSI)															
RESISTIVITY (OHM-CM)															
TORQUE (INCH -LBS.)															
RUPTURE PRESS. (IN.HG)															
VISUAL OBSERVATIONS	P	P	P			OBSER		OBSER		P	P	P	W	W	W

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) 200°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C1	C1	C1	C	C1	C	C1	C	C1			W	W	W
ACID NO. mgKOH/gm	.005	.005	.007	.001	.001	.001	.002	.003	.003		0.015	W	W	W
GUMS mg/100ml	2.4	17.6	6.6	.6	.8	4.4	2.8	9.6	8.6		7	W	O	W
HYDROPEROXIDES mM/l	.00	.02	.02	.001	.002	0	.032	0	.018			W	W	O
CONDUCTIVITY pS/m @72°F	107	291	539	100	66	248	131	912	410	150	600	O	W	W
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>ILG.1 / I. G.10</u>	MATERIAL / IDENTITY:	<u>FLUOROSILICONE, MIL-R-25988</u>
TEST TEMPERATURE (°F)	<u>275</u>	USE:	<u>AIRFRAME / ENGINE FUEL SYSTEM, GASKET "O" RING</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>21 DEC '95</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	89	BROKE	BROKE	1187	45%				-93	-100	-100	OT	OT	OT
ELONGATION (%)	17	BROKE	BROKE	183	35				-91	-100	-100	OT	OT	OT
VOLUME SWELL (%)	2	-7	-4	N/A		0		25	P	F	F	W	OT	OT
HARD'S; a) SHORE A (PTS)	72	83	76	74	20				-2	+9	+2	W	W	W
b) PENCIL														
COMP. SET (avg. 2 spcm's)	29	29	29	N/A				30	P	P	P	W	W	W
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) 275°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C2	C	C2	C	C2			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	NE	.003	.03	.003	.02		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	.6	NE	4.	13	9.6	41.8		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.001	NE	.22	0.0	0	0.0			NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	100	NE	248	NE	912	NE	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	II.G.1	MATERIAL / IDENTITY:	FLUOROSILICONE, MIL-R-25988
TEST TEMPERATURE (°F)	325	USE:	ENGINE / AIRFRAME, FUEL SYSTEM, GASKET FUEL CONT.
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	7 SEPT '94	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	231	276	279	1187	45%				-31	-77	-76	OT	OT	OT
ELONGATION (%)	64	56	64	183	35				-65	-69	-65	OT	OT	OT
VOLUME SWELL (%)	6	5	5	N/A		0		25	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	65	66	66	74	20				-9	-8	-8	W	W	W
b) PENCIL														
COMP. SET (%) (avg. 2 spcm's)	54	60	60	N/A				30	F	F	F	OT	OT	OT
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) *325 F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C2	C	C2	C	C2			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.007	.001	.006	.003	.008		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	2	3	4.4	3.4	9.6	12.2		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.017	0	.015	0	.008			NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	108	123	248	141	912	555	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S.A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	II.G.2	MATERIAL / IDENTITY:	FLUOROSILICONE, MIL-R-25988
TEST TEMPERATURE (°F)	250	USE:	ENGINE / AIRFRAME, FUEL SYSTEMS GASKET
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	20 JUN '95	JP-8 BASELINE FUEL:	92 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	162	546	562	984	45%				-84	-45	-43	OT	W	W
ELONGATION (%)	130	225	192	195	35				-33	+15	-2	W	W	W
VOLUME SWELL (%)	4	9	8	N/A		0		25	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	44	54	58	65	20				-21	-11	-7	OT	W	W
b) PENCIL														
COMP. SET (%) (avg. 2 spcm's)	18	NT	NT	N/A				30	P	NE	NE	W	NE	NE
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) 250°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.002	.003	.003	.003	.002		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	.6	3.6	4.0	4	9.6	6.4		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.001	.01	.22	.01	0	.01			NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	100	NE	248	NE	912	NE	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	II.G.2/LG.5	MATERIAL / IDENTITY:	FLUOROSILICONE "O" RING MIL-R-25988
TEST TEMPERATURE (°F)	325	USE:	ENGINE COMPONENTS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	7 SEPT '94	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	121	131	139	896	45%				-86	-85	-84	OT	OT	OT
ELONGATION (%)	88	96	82	214	35				-59	-55	-62	OT	OT	OT
VOLUME SWELL (%)	11	10	10	N/A		0		25	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	38	40	41	67	20				-29	-27	-26	OT	OT	OT
b) PENCIL														
COMP. SET (%) (avg. 2 specm's)	60	60	57	N/A				30	F	F	F	OT	OT	OT
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) 325°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C3	C3	C3	C	C2	C	C2	C	C2			W	W	W
ACID NO. mgKOH/gm	.003	.010	.004	.001	.007	.001	.006	.003	.008		0.015	W	W	W
GUMS mg/100ml	12.0	13.6	20.0	2	3	4.4	3.4	9.6	12.2		7	O	O	O
HYDROPEROXIDES mM/l	.025	.001	NE	.004	.017	O	.015	0	.008			O	W	NE
CONDUCTIVITY pS/m @72°F	343	1011	627	108	123	248	141	912	555	150	600	W	O	W
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>IL.G.3/L.G.7</u>	MATERIAL / IDENTITY:	<u>FLUOROCARBON, MIL-R-83485</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>ENGINE / AIRFRAME, FUEL SYSTEM GASKETS, "O" RING</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>7 SEPT '94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	1260	1259	1265	1644	20%				-23	-23	-23	W	W	W
ELONGATION (%)	168	166	174	166	20%				+1	0	+5	W	W	W
VOLUME SWELL (%)	7	8	7	N/A		0		10	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	72	73	73	76	5		5		-4	-3	-3	W	W	W
b) PENCIL														
COMP. SET (%) (avg. 2 spcm's)	51	46	51	N/A				60	P	P	P	W	W	W
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) 325°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C3	C4	C2	C	C2	C	C2	C	C2			W	O	W
ACID NO. mgKOH/gm	NE	.009	NE	.001	.007	.001	.006	.003	.008		0.015	NE	W	N W
GUMS mg/100ml	3.6	7.4	26	2	3	4.4	3.4	9.6	12.2		7	W	O	O
HYDROPEROXIDES mM/l	NE	.001	NE	.004	.017	0	.015	0	.008			NE	W	NE
CONDUCTIVITY pS/m @72°F	29	54	418	108	123	248	141	912	535	150	600	O	O	W
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J.DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF: S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>ILG.3/LG.7</u>	MATERIAL / IDENTITY:	<u>FLUOROCARBON, MIL-R-83485</u>
TEST TEMPERATURE (°F)	<u>400</u>	USE:	<u>ENGIN /AIRFRAME, FUEL SYSTEM GASKETS, "O" RING</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>29 OCT '96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	1301	1333	1329	1644	20%				-21	-19	-19	W	W	W
ELONGATION (%)	161	162	155	166	20				-3	-2	-7	W	W	W
VOLUME SWELL (%)	9	8	8	N/A		0		10	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	71	71	71	76	5		5		-5	-5	-5	W	W	W
b) PENCIL														
COMP. SET (%) (avg. 2 spcm's)	37	29	35	N/A				60	P	P	P	W	W	W
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) 400°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C3	C	C3	C	C3			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.009	.001	.008	.003	.012		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	2	4.8	4.4	8.4	9.6	22.4		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.03	0	0	0	0			NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	108	5	248	5	932	428	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>II.G.4/LG.8</u>	MATERIAL / IDENTITY:	<u>PERFLUOROELASTOMER, AMS 7257</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>ENGINE / AIRFRAME, FUEL SYSTEMS, GASKET "O" RING</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>25 OCT '94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	2011	2168	2161	2313	20%				-13	-6	-7	W	W	W
ELONGATION (%)	155	123	124	110	15				+5	+12	+13	W	W	W
VOLUME SWELL (%)	3	3	3	N/A		0		5	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	82	83	82	84	5		5		-2	-1	-2	W	W	W
b) PENCIL														
COMP. SET (%) (avg. 2 spcm's)	57	54	54	N/A				60	P	P	P	W	W	W
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) 325°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C3	C3	C3	C	C2	C	C2	C	C2			W	W	W
ACID NO. mgKOH/gm	NE	NE	NE	.001	.007	.001	.006	.003	.008		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	2	3	4.4	3.4	9.6	12.2		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.017	0	.015	0	.008			NE	NE	NE
CONDUCTIVITY pS/m @72°F	25	167	348	108	123	248	141	912	555	150	600	O	W	W
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	II.G.5	MATERIAL / IDENTITY:	FLUOROSILICONE, MIL-R-25988 (Modified)
TEST TEMPERATURE (°F)	275	USE:	ENGINE / AIRFRAME, FUEL SYSTEM GASKETS, "O" RINGS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	17 JAN '96	JP-8 BASELINE FUEL:	92 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	BROKE	BROKE	BROKE	966	45%				-100	-100	-100	OT	OT	OT
ELONGATION (%)	BROKE	BROKE	BROKE	135	35				-100	-100	-100	OT	OT	OT
VOLUME SWELL (%)	BROKE	BROKE	BROKE	N/A		0		25	F	F	F	OT	OT	OT
HARD'S; a) SHORE A (PTS)	BROKE	BROKE	BROKE	67	20				F	F	F	OT	OT	OT
b) PENCIL														
COMP. SET (%) (avg. 2 spcm's)	62	78	76	N/A				30	F	F	F	OT	OT	OT
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) *275F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C2	C	C2	C	C2			NE	NE	NSR
ACID NO. mgKOH/gm	NE	NE	NE	.001	NE	.003	.03	.003	.02		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	.6	NE	4.0	13.0	9.6	41.8		7	NE	NE	NSR
HYDROPEROXIDES mM/l	NE	NE	NE	.001	NE	.22	0.0	0	0.0			NE	NE	NSR
CONDUCTIVITY pS/m @72°F	NE	NE	NE	100	120	248	141	912	555	150	600	NE	NE	NSR
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF: S.A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	II.G.5	MATERIAL / IDENTITY:	FLUOROSILICONE MIL-R-25988 (Modified)
TEST TEMPERATURE (°F)	325	USE:	ENGINE /AIRFRAME, FUEL SYSTEMS GASKETS, "O" RINGS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	7 SEPT '94	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	237	201	135	966	45%				-75	-79	-86	OT	OT	OT
ELONGATION (%)	138	116	92	135	35				+2	-14	-32	W	W	W
VOLUME SWELL (%)	12	11	8	N/A				25	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	39	43	(SOFT)0	67	20				-28	-24	-67	OT	OT	OT
b) PENCIL														
COMP. SET (%) (avg. 2 spcm's)	NT	NT	NT	N/A				30	NE	NE	NE	NE	NE	NE
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) 325°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C3	C4	C3	C	C2	C	C2	C	C2			NSR	NSR	NSR
ACID NO. mgKOH/gm	.002	.007	.006	.001	.007	.001	.006	.003	.008		0.015	W	W	W
GUMS mg/100ml				2	3	4.4	3.4	9.6	12.2		7	W	OT	NSR
HYDROPEROXIDES mM/l				.004	.017	0	.015	0	.008			NSR	NSR	NSR
CONDUCTIVITY pS/m @72°F				108	123	248	141	912	555	150	600	OT	OT	NSR
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S.A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	II.G.6	MATERIAL / IDENTITY:	FLUOROCARBON, MIL-R-83485
TEST TEMPERATURE (°F)	325	USE:	ENGINE / AIRFRAME, FUEL SYSGEMS GASKETS "O" RINGS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	25 OCT '94	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	1924	1858	1875	2382	20%				-19	-22	-21	W	W	W
ELONGATION (%)	226	204	217	193	20				+17	+6	+12	W	W	W
VOLUME SWELL (%)	7	7	7	N/A		0		10	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	73	73	72	75	5			5	-2	-2	-3	W	W	W
b) PENCIL														
COMP. SET (%) (avg. 2 spcm's)	20	26	26	N/A				60	P	P	P	W	W	W
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) 325°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C2	C3	C3	C	C2	C	C2	C	C2			W	W	W
ACID NO. mgKOH/gm	.005	.004	ND	.001	.007	.001	.006	.003	.008		0.015	W	W	W
GUMS mg/100ml	4	7	20.6	2	3	4.4	3.4	9.6	12.2		7	W	W	O
HYDROPEROXIDES mM/L	.0114	.01	.019	.004	.017	0	.015	0	.008			W	W	O
CONDUCTIVITY pS/m @72°F	34	168	423	108	123	248	141	912	555	150	600	O	W	W
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S.A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	II.G.6	MATERIAL / IDENTITY:	FLUOROCARBON, MIL-R-83485
TEST TEMPERATURE (°F)	400	USE:	ENGINE/AIRFRAME, FUEL SYSTEM GASKETS "O" RINGS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	6 SEP 96	JP-8 BASELINE FUEL:	93 POSF 2980+ (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	1638	1677	1807	2382	20%				-31	-30	-24	OT	OT	OT
ELONGATION (%)	188	189	199	193	20				-3	-2	+3	W	W	W
VOLUME SWELL (%)	7	7	7	N/A		0		10	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	72	72	72	75	5		5		-3	-3	-3	W	W	W
b) PENCIL														
COMP. SET (%) (avg. 2 spcm's)	33	29	30	N/A				60	P	P	P	W	W	W
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) 400°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C3	C	C3	C	C3			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.009	.001	.008	.003	.012		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	2	4.8	4.4	8.4	9.6	224		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.03	0	0	0	0			NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	108	5	248	5	.932	428	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S.A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	II.G.7	MATERIAL / IDENTITY:	FLUOROSILICONE, MIL-R-25988
TEST TEMPERATURE (°F)	325	USE:	ENGINE/AIRFRAME, FUEL SYSTEM GASKETS "O" RING
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	18 OCT '94	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	339	247	352	1088	45%				-69	-73	-68	OT	OT	OT
ELONGATION (%)	90	88	93	126	35				-29	-30	-26	W	W	W
VOLUME SWELL (%)	6	6	6	N/A		0		25	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	62	59	61	76	20				-14	-17	-15	W	W	W
b) PENCIL														
COMP. SET (%) (avg. 2 spcm's)	45	38	35	N/A				30	F	F	F	OT	OT	OT
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) 325°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C3	C4	C4	C	C2	C	C2	C	C2			W	O	O
ACID NO. mgKOH/gm	.008	.010	.010	.001	.007	.001	.006	.003	.008		0.015	W	W	W
GUMS mg/100ml	6.4	7.0	14.4	2	3	4.4	3.4	9.6	12.2		7	W	W	O
HYDROPEROXIDES mM/l	.024	.016	.016	0.004	0.017	0	0.015	0	0.008			O	O	O
CONDUCTIVITY pS/m @72°F	82	126	507	108	128	248	141	912	535	150	600	O	O	W
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S.A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	II.G.8	MATERIAL / IDENTITY:	PERFLUOROELASTOMER, AMS 7257A
TEST TEMPERATURE (°F)	325	USE:	ENGINE/AIRFRAME, FUEL SYSTEM GASKETS "O" RING
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	25 OCT '94	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	1480	1435	1396	1484	20%				0	-3	-6	W	W	W
ELONGATION (%)	132	129	128	124	15				+6	+4	+3	W	W	W
VOLUME SWELL (%)	3	3	3	N/A		0		5	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	74	74	74	75	5		5		-1	-1	-1	W	W	W
b) PENCIL														
COMP. SET (%) (avg. 2 spcm's)	68	71	64	N/A				60	F	F	F	O	O	O
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) 325°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C3	C3	C3	C	C2	C	C2	C	C2			W	W	W
ACID NO. mgKOH/gm	.006	.007	.015	.001	.007	.001	.006	0.003	0.008		0.015	W	W	W
GUMS mg/100ml	12.6	14.2	224	2	3	4.4	3.4	9.6	12.2		7	O	O	O
HYDROPEROXIDES mM/l	.004	.011	0.00	.004	0.017	0	0.015	0	0.008			W	W	W
CONDUCTIVITY pS/m @72°F	64	87	511	108	128	248	141	912	555	150	600	O	O	W
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF: S.A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>II.G.9/L.G.6</u>	MATERIAL / IDENTITY:	<u>FLUOROCARBON, MIL-R-83248</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>ENGINE/AIRFRAME, FUEL SYSTEM GASKET "O" RING</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>3 MAR'95</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	1200	1204	1113	1671	20%				-28	-28	-33	O	W	O
ELONGATION (%)	188	192	164	177	20				+6	+8	-7	W	W	W
VOLUME SWELL (%)	6	5	4	N/A		0		10	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	72	72	72	75	5		5		-3	-3	-3	W	W	W
b) PENCIL														
COMP. SET (%) (avg. 2 spcm's)	24	24	24	N/A				60	P	P	P	W	W	W
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) 325°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C3	C3	C3	C	C1	C	C2	C	C2			W	W	W
ACID NO. mgKOH/gm	.005	.007	.011	0.001	0.002	.001	.002	0.003	0.003		0.015	W	W	W
GUMS mg/100ml	3.8	6	15.6	2	4.8	4.4	2.8	9.6	8.6		7	W	W	O
HYDROPEROXIDES mM/l	.002	.006	.006	0.004	0.037	0	0.032	0	0.018			W	W	W
CONDUCTIVITY pS/m @72°F	16	97	366	108	39	248	131	912	410	150	600	O	O	W
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF: S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>ILG.10/LG.11</u>	MATERIAL / IDENTITY:	<u>URETHANE, SEAL</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>ENGINE/AIRFRAME, FUEL SYSTEM PUMP WASHER</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>2 JULY 96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS						
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION			
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4	
	POST	POST	POST												
TENSILE (PSI)															
ELONGATION (%)															
VOLUME SWELL (%)															
HARD'S; a) SHORE A (PTS)															
b) PENCIL															
COMP. SET (%) (avg. 2 specm's)															
LAP SHEAR (PSI)															
COHESION (%)															
TAPE ADHESION (P/F)															
PEEL STRENGTH (LB/IN)															
LAMINAR SHEAR (PSI)															
RESISTIVITY (OHM-CM)															
TORQUE (INCH -LBS.)															
RUPTURE PRESS. (IN.HG)															
VISUAL OBSERVATIONS	F	F	F	P		P				F	F	F	OT	OT	OT

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) 325°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C2	C	C2			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	0.001	0.002	.001	.006	0.003	0.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	2	2.2	4.4	3.4	9.6	12.2		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	0.004	0.018	0	0.015	0	0.008			NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	108	1	248	141	912	555	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>ILG.11/LG.12</u>	MATERIAL / IDENTITY:	<u>URETHANE, TANG SEAL</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>ENGINE/AIRFRAME, FUEL SYSTEM PUMP TANG</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>27 AUG '96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS						
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION			
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4	
	POST	POST	POST												
TENSILE (PSI)															
ELONGATION (%)															
VOLUME SWELL (%)															
HARD'S; a) SHORE A (PTS)															
b) PENCIL															
COMP. SET (%) (avg. 2 specm's)															
LAP SHEAR (PSI)															
COHESION (%)															
TAPE ADHESION (P/F)															
PEEL STRENGTH (LB/IN)															
LAMINAR SHEAR (PSI)															
RESISTIVITY (OHM-CM)															
TORQUE (INCH -LBS.)															
RUPTURE PRESS. (IN.HG)															
VISUAL OBSERVATIONS	F	F	F	P		P				F	F	F	OT	OT	OT

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) 325°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C2	C	C2			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	0.001	0.002	.001	.006	0.003	0.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	2	2.2	4.4	3.4	9.6	12.2		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	0.004	0.018	0	0.015	0	0.008			NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	108	1	248	141	912	555	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
 Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
 W = Within Allowable Requirement; O = Outside Allowable Requirement
 OT = Material Tested Beyond Temperature Range
 N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
 UDRI TECH: J. DUES
 UDRI ENG: B. WILT
 UDRI P.L. ENG: D.H. KALT
 A.F. AUT. W./MLSE: A. FLETCHER
 A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	ILG.12	MATERIAL / IDENTITY:	FLUOROCARBON, MIL-R-83485
TEST TEMPERATURE (°F)	325	USE:	ENGINE/AIRFRAME, FUEL SYSTEM, GASKET "O" RINGS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	2 JULY 96	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	1406	1438	1443	1795	20%				-22	-20	-20	W	W	W
ELONGATION (%)	181	185	188	151	20				+20	+23	+25	W	W	W
VOLUME SWELL (%)	NE	NE	NE	N/A		0		10						
HARD'S; a) SHORE A (PTS)	NE	NE	NE	76	5		5							
b) PENCIL														
COMP. SET (%) (avg. 2 spcm's)	NE	NE	NE	N/A				60						
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) 325°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C2	C	C2			NE	NE	NE
ACID NO. mgKOH/gm	.006	.008	.008	0.001	0.002	.001	.006	0.003	0.008		0.015	W	W	W
GUMS mg/100ml	4.0	7.2	15.0	2	2.2	4.4	3.4	9.6	12.2		7	W	W	O
HYDROPEROXIDES mM/l	.005	ND	ND	0.004	0.018	0	0.015	0	0.008			W	O	O
CONDUCTIVITY pS/m @72°F	NE	NE	NE	108	1	248	141	912	555	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
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OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S.A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	ILG.12	MATERIAL / IDENTITY:	FLUOROCARBON, MIL-R-83485
TEST TEMPERATURE (°F)	400	USE:	ENGINE/AIRFRAME, FUEL SYSTEM, GASKETS "O" RING
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	22 AUG '96	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	1451	1468	1459	1795	20%				-19	-18	-19	W	W	W
ELONGATION (%)	157	166	164	151	20				+4	+10	+9	W	W	W
VOLUME SWELL (%)	7	6	6	N/A		0		10	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	73	74	73	76	5		5		-3	-2	-3	W	W	W
b) PENCIL														
COMP. SET (%) (avg. 2 spcm's)	NE	NE	NE	N/A				60						
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) 325°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C3	C3	C3	C	C3	C	C3	C	C3			W	W	W
ACID NO. mgKOH/gm	.005	.009	.013	.001	.009	.001	.008	.003	.012		0.015	W	W	W
GUMS mg/100ml	4.4	9.8	23.4	2	4.8	4.4	8.4	9.6	22.4		7	W	O	O
HYDROPEROXIDES mM/l	.03	.01	.04	.004	.03	0	0	0	0			W	O	O
CONDUCTIVITY pS/m @72°F	19	114	429	108	5	248	5	932	428	150	600	O	O	W
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	ILG.13	MATERIAL / IDENTITY:	FLUOROSILICONE, MIL-R-25988
TEST TEMPERATURE (°F)	200	USE:	ENGINE/AIRFRAME, FUEL SYSTEM, GASKETS "O" RING
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	8 OCT '96	JP-8 BASELINE FUEL:	92 POSF 2926 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	604	581	671	942	45%				-36	-38	-29	W	W	W
ELONGATION (%)	119	124	119	112	35				+6	+11	+6	W	W	W
VOLUME SWELL (%)	5	4	4	N/A		0		5	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	67	67	68	73	20				-6	-6	-5	W	W	W
b) PENCIL														
COMP. SET (%) (avg. 2 spcm's)	19	25	31	N/A				30	P	P	P	W	W	W
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) 325°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C1	C1	C1	C	C1	C	C1	C	C1			W	W	W
ACID NO. mgKOH/gm	NE	NE	NE	.001	.001	.001	.002	.003	.003		0.015	W	W	W
GUMS mg/100ml	2.8	6.6	18.0	.6	.8	4.4	2.8	9.6	8.6		7	W	W	O
HYDROPEROXIDES mM/l	NE	NE	NE	.001	.002	0	.032	0	.018			NE	NE	NE
CONDUCTIVITY pS/m @72°F	129	424	707	100	66	248	131	912	410	150	600	O	W	O
VISUAL OBSERVATIONS														

NOTES:

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Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S.A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	ILG.13	MATERIAL / IDENTITY:	FLUOROSILICONE, MIL-R-25988
TEST TEMPERATURE (°F)	325	USE:	ENGINE/AIRFRAME, FUEL SYSTEM, GASKETS "O" RING
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	26 SEPT '96	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	BROKE	101	13	942	45%				-100	-89	-99	OT	OT	OT
ELONGATION (%)	BROKE	30	30	112	35				-100	-73	-73	OT	OT	OT
VOLUME SWELL (%)	-15	-2	-3	N/A		0		25	F	F	F	OT	OT	OT
HARD'S; a) SHORE A (PTS)	84	-74	73	73	20				+11	+1	0	W	W	W
b) PENCIL														
COMP. SET (%) (avg. 2 spcm's)	52	54	49	N/A				30	F	F	F	OT	OT	OT
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) 325°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C4	C4	C4	C	C1	C	C2	C	C2			O	O	O
ACID NO. mgKOH/gm	.005	.010	.010	0.001	0.002	.001	.006	0.003	0.008		0.015	W	W	W
GUMS mg/100ml	12.2	9.0	25.2	0.6	2.2	4.4	3.4	9.6	12.1		7	O	O	O
HYDROPEROXIDES mM/l	0.00	0.00	0.00	.001	0.018	0	0.015	0	0.008			W	W	W
CONDUCTIVITY pS/m @72°F	90	89	218	100	1	248	141	912	555	150	600	O	O	W
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
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UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S.A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>ILG.14</u>	MATERIAL / IDENTITY:	<u>FLUOROSILICONE, MIL-R25988</u>
TEST TEMPERATURE (°F)	<u>180</u>	USE:	<u>AIRFRAME, "O" RING ENGINE FUEL CONTROL</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>13 MAR '96</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	807	861	943	948	45%				-15	-9	-1	W	W	W
ELONGATION (%)	207	218	243	213	35				-3	+2	+14	W	W	W
VOLUME SWELL (%)	7	7	7	N/A		0		25	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	69	70	71	63	20				+6	+7	+8	W	W	W
b) PENCIL														
COMP. SET (%) (avg. 2 spcm's)	22	26	28	N/A				30	P	P	P	W	W	W
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) 325°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C2	C	C2			NE	NE	NE
ACID NO. mgKOH/gm	0.003	0.003	0.003	0.001	0.003	.001	.003	.003	.007		0.015	W	W	W
GUMS mg/100ml	1.4	5	13.8	0.6	6.0	4.4	4.0	9.6	8.4		7	W	W	O
HYDROPEROXIDES mM/l	0.13	0	0	0.001	ND	0	.022	0	.00			O	W	W
CONDUCTIVITY pS/m @72°F	329	639	809	100	NE	248	NE	912	NE	150	600	W	O	O
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	ILG.15	MATERIAL / IDENTITY:	FLUOROSILICONE/TEFLON, MIL-R-25988
TEST TEMPERATURE (°F)	200	USE:	ENGINE, AIRFRAME, FUEL SYSTEM, GASKETS "O" RING
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	24 SEPT '96	JP-8 BASELINE FUEL:	92 POSF 2926 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	761	735	794	763	45%				0	-4	+4	W	W	W
ELONGATION (%)	107	99	107	120	35				-11	-18	-11	W	W	W
VOLUME SWELL (%)	9	9	9	N/A		0		25	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	67	68	68	72	20				-5	-4	-4	W	W	W
b) PENCIL														
COMP. SET (%) (avg. 2 specm's)	18	21	15	N/A				30	P	P	P	W	W	W
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) 325°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C1	C1	C1	C	C1	C	C2	C	C2			W	W	W
ACID NO. mgKOH/gm	.004	.002	.005	.001	.001	.001	.002	.003	.003		0.015	W	W	W
GUMS mg/100ml	3.2	6.0	16.8	.6	.8	4.4	2.8	9.6	8.6		7	W	W	O
HYDROPEROXIDES mM/l	0.00	0.00	0.00	.001	.002	0	.038	0	.018			W	W	W
CONDUCTIVITY pS/m @72°F	122	407	653	100	66	248	131	912	410	150	600	O	W	O
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

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Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S.A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	ILG.15	MATERIAL / IDENTITY:	FLUOROSILICONE, TEFLON, MIL-R-25988
TEST TEMPERATURE (°F)	325	USE:	ENGINE, AIRFRAME, FUEL SYSTEMS GASKETS, "O" RING
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	NTP	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (%) (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) 325°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)														
ACID NO. mgKOH/gm											0.015			
GUMS mg/100ml											7			
HYDROPEROXIDES mM/l														
CONDUCTIVITY pS/m @72°F										150	600			
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.H.1</u>	MATERIAL / IDENTITY:	<u>SELF SEALING, HOSE</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL TRANSFER HOSE</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>NTP</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (%) (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) 325°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)														
ACID NO. mgKOH/gm											0.015			
GUMS mg/100ml											7			
HYDROPEROXIDES mM/l														
CONDUCTIVITY pS/m @72°F										150	600			
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

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Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.H.2</u>	MATERIAL / IDENTITY:	<u>ACRYLIC/NITRILE, MIL-H-4495</u>
TEST TEMPERATURE (°F)	<u>160</u>	USE:	<u>AIRFRAME, AERIAL REFUELING HOSE</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>27 APR '96</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	1417	NE	NE	1684	20%				-16			W	NE	NE
ELONGATION (%)	190	NE	NE	250	30				-24			W	NE	NE
VOLUME SWELL (%)	1	NE	NE	N/A				8	P			W	NE	NE
HARD'S; a) SHORE A (PTS)	63	NE	NE	66	12		12		-3			W	NE	NE
b) PENCIL														
COMP. SET (%) (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) 325°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	0.001	NE	0.001	0.002	0.003	0.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	0.6	NE	4.4	5.2	9.6	12.4		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	0.001	NE	0	0.01	0	ND			NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	100	NE	248	NE	912	NE	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
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Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.H.2</u>	MATERIAL / IDENTITY:	<u>ACRYLIC/NITRILE, MIL-H-4495</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, AERIAL REFUELING HOSE</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>25 MAR 96</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS						
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION			
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4	
	POST	POST	POST												
TENSILE (PSI)	844	845	964	1684	20%				-50	-50	-43	OT	OT	OT	
ELONGATION (%)	44	32	52	250	30				-82	-87	-79	OT	OT	OT	
VOLUME SWELL (%)	-5	-6	-6	N/A				8	P	P	P	W	W	W	
HARD'S; a) SHORE A (PTS)	80	82	79	66	12		12		+14	+16	+13	OT	OT	OT	
b) PENCIL															
COMP. SET (%) (avg. 2 specm's)															
LAP SHEAR (PSI)															
COHESION (%)															
TAPE ADHESION (P/F)															
PEEL STRENGTH (LB/IN)															
LAMINAR SHEAR (PSI)															
RESISTIVITY (OHM-CM)															
TORQUE (INCH -LBS.)															
RUPTURE PRESS. (IN.HG)															
VISUAL OBSERVATIONS															
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL											
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) 325°F 7 DAYS											
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		SPECIFICATION RANGE			GENERAL		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	FOR JP-8		OBSERVATIONS			
										MIN	MAX				
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE	
ACID NO. mgKOH/gm	NE	NE	NE	.001	.001	.001	.002	.003	.003		0.015	NE	NE	NE	
GUMS mg/100ml	NE	NE	NE	.6	.8	4.4	2.8	9.6	8.6		7	NE	NE	NE	
HYDROPEROXIDES mM/l	NE	NE	NE	.001	.002	0	.038	0	.018			NE	NE	NE	
CONDUCTIVITY pS/m @72°F	NE	NE	NE	100	66	248	131	912	410	150	600	NE	NE	NE	
VISUAL OBSERVATIONS															

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
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DATE: 24 MAR 98
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UDRI ENG: B. WILT
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A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.H.3</u>	MATERIAL / IDENTITY:	<u>NITRILE, MIL-H-370</u>
TEST TEMPERATURE (°F)	<u>200/160</u>	USE:	<u>AIRFRAME, GROUND REFUELING HOSE</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>19 MAR '96</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	374/1525	1189/NE	1316/NE	1626	20%				-77/-6	-27/NE	-19/NE	OT/W	OT/NE	W/NE
ELONGATION (%)	45/216	54/NE	75/NE	308	30				-85/-30	-82/NE	-76/NE	OT/W	OT/NE	OT/NE
VOLUME SWELL (%)	-3/2	-3/NE	-3/NE	N/A				8	P/P	P/NE	P/NE	W/W	W/NE	W/NE
HARD'S; a) SHORE A (PTS)	82/66	83/NE	79/NE	67	12		12		+15/-1	+16/NE	+12/NE	OT/W	OT/NE	W/NE
b) PENCIL														
COMP. SET (%) (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) 325°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.001	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	.6	.8	4.4	2.8	9.6	8.6		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.001	.002	0	.032	0	.018			NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	100	66	248	131	912	410	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
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DATE: 24 MAR 98
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UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.H.4</u>	MATERIAL / IDENTITY:	<u>NITRILE, MIL-H-17902</u>
TEST TEMPERATURE (°F)	<u>200/160</u>	USE:	<u>AIRFRAME, NAVAIR AIRCRAFT CARRIER HOSE</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>26 MAR '96</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	1612/3058	2140	2764	3458/3452	20%				-53/-11	-38	-20	OT/W	OT	W
ELONGATION (%)	112/405	149	177	532	30				-79/-24	-72	-67	OT/W	OT	OT
VOLUME SWELL (%)	-1/0	-1	-2	N/A				8	P/P	P	P	W/W	W	W
HARD'S; a) SHORE A (PTS)	76/65	75	74	66	12		12		+10/-1	+9	+8	W/W	W	W
b) PENCIL														
COMP. SET (%) (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) 325°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.001	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	.6	.2	4.4	2.8	9.6	8.6		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.001	.002	0	.032	0	.018			NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	100	66	248	131	912	410	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.H.5</u>	MATERIAL / IDENTITY:	<u>EPICHLOROHYDRIN, MIL-H-26521</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, GROUND REFUELING HOSE</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>20 MAR '96</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	685	1591	1516	1806	20%				-62	-12	-16	OT	W	W
ELONGATION (%)	274	416	408	538	30				-49	-23	-24	OT	W	W
VOLUME SWELL (%)	7	6	6	N/A				8	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	51	56	56	62	12		12		-11	-6	-6	W	W	W
b) PENCIL														
COMP. SET (%) (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) 325°F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.001	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	.6	.8	4.4	2.8	9.6	8.6		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.001	.002	0	.032	0	.018			NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	100	66	248	131	912	410	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>LL 1</u>	MATERIAL / IDENTITY:	<u>TFE (TEFLON)</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, INSULATION/ELECTRICAL/WIER/CLAMPS/MISC</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>23 FEB '95</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	1960	1934	1951	1937	20%				+1	0	+1	W	W	W
ELONGATION (%)	146	154	143	208	30				-30	-26	-31	W	W	W
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS *	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	.004	.003	.005	.001	.002	.001	.002	.003	.003		0.015	W	W	W
GUMS mg/100ml	1.4	4.8	5.8	2	4.8	4.4	2.8	9.6	8.6		7	W	W	W
HYDROPEROXIDES Mm/l	.018	.096	NE	.004	.037	0	.032	0	.018			O	O	NE
CONDUCTIVITY Ps/m @72°F	449	644	852	108	39	248	131	912	410	150	600	W	O	O
VISUAL OBSERVATIONS														

NOTES:

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OT = Material Tested Beyond Temperature Range
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Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>II. 2</u>	MATERIAL / IDENTITY:	<u>NYLON (OLD), ASTM D 4066</u>
TEST TEMPERATURE (°F)	<u>160</u>	USE:	<u>AIRFRAME, INSULATION/ELECTRICAL/WIRE/CLAMPS/MISC</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>27 DEC '95</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	12244	11980	11071	10992	20%				+11	-9	+1	W	W	W
ELONGATION (%)	97	131	159	376	10				-74	-65	-58	O	W	W
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C1	CC2	C2	C	C1	C	C1	C	C1			W	W	W
ACID NO. mgKOH/gm	.003	.003	.004	0.001	NE	.001	0.002	.003	0.003		0.015	W	W	W
GUMS mg/100ml	1.0	5.0	13.0	0.6	NE	4.4	5.2	9.6	12.4		7	W	W	O
HYDROPEROXIDES Mm/l	NE	NE	NE	0.001	NE	0	0.01	0	ND			NE	NE	NE
CONDUCTIVITY Ps/m @72°F	141	410	162	100	NE	248	NE	912	NE	150	600	O	W	W
VISUAL OBSERVATIONS														

NOTES:

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DATE: 24 MAR 98
UDRI TECH: J. DUES
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A.F. AUT. W./MLSE: A. FLETCHER
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Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	II. 2	MATERIAL / IDENTITY:	NYLON (OLD), ASTM D 4066
TEST TEMPERATURE (°F)	200	USE:	AIRFRAME, INSULATION/ELECTRICAL/WIRE/CLAMPS/MISC
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	27 DEC '95	JP-8 BASELINE FUEL:	92 POSF 2926 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	12600	11862	12534	10992	20%				+15	+8	+14	W	W	W
ELONGATION (%)	39	58	86	376	10				-90	-85	-77	O	O	O
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C1	C2	C2	C	C1	C	C1	C	C1			W	W	W
ACID NO. mgKOH/gm	.003	.003	.004	.001	.001	.001	.002	.003	.003		0.015	W	W	W
GUMS mg/100ml	NE	NE	NE	.6	.8	4.4	2.8	9.6	8.6		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.001	.002	0	.032	0	.018			NE	NE	NE
CONDUCTIVITY pS/m @72°F	155	371	623	100	66	248	131	912	410	150	600	W	W	O
VISUAL OBSERVATIONS														

NOTES:

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W = Within Allowable Requirement; O = Outside Allowable Requirement
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Between Material Degradation and Fuel Properties Degradation

DATE: 23 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>II. 2</u>	MATERIAL / IDENTITY:	<u>NYLON, ASTM D 4066 (NEW)</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL SYSTEM CLAMPS, WIRE INSULATION</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>25 JAN 96</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	9138	12116	10510	11680	20				-22%	+4%	-10%	O	W	W
ELONGATION (%)	84	172	148	380	10				-78%	-55%	-61%	O	W	W
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)				C	C1	C	C1	C	C1					
ACID NO. mgKOH/gm				.001	.001	.001	.002	.003	.003		0.015			
GUMS mg/100ml				.6	.8	4.4	2.8	9.6	8.6		7			
HYDROPEROXIDES mM/l				.001	.002	0	.032	0	.018					
CONDUCTIVITY pS/m @72°F				100	66	248	131	912	410	150	600			
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
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DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>LL 3</u>	MATERIAL / IDENTITY:	<u>POLYETHYLENE (HDP)</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, INSULATION/ELECTRICAL WIRE/CLAMPS/MISC</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>21 FEB '95</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	3097	3104	3072	4554	20%				-32	-32	-33	O	W	W
ELONGATION (%)	172	215	194	39	10				+341	+451	+397	W	W	W
VOLUME SWELL (%)														
HARD’S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 specm’s)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	.001	.001	.003	.001	.002	.001	.002	.003	.003		0.015	W	W	W
GUMS mg/100ml	2.4	5.0	11.6	2	4.8	4.4	2.8	9.6	8.6		7	W	W	O
HYDROPEROXIDES mM/l	.025	.297	NE	.004	.037	0	.032	0	.018			O	O	NE
CONDUCTIVITY pS/m @72°F	444	617	857	108	39	248	131	912	410	150	600	W	O	O
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF: S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>LL 4</u>	MATERIAL / IDENTITY:	<u>KAPTON UPILEX</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, INSULATION/ELECTRICAL WIRE/CLAMPS/MISC</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>28 JUN '96</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	15973	15947	15360	16107	20%				-1	-1	-5	W	W	W
ELONGATION (%)	50	53	42	46	10				+9	+24	-9	W	W	W
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.001	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	.6	.8	4.4	2.8	9.6	8.6		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.001	.002	0	.032	0	.018			NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	100	66	248	131	912	410	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>LL 6</u>	MATERIAL / IDENTITY:	<u>VINYL PLASTIC TUBING,MIL-I-7444D</u>
TEST TEMPERATURE (°F)	<u>200/160</u>	USE:	<u>AIRFRAME, FUEL SYSTEM, FUEL TANK</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>11 JULY 97</u>	JP-8 BASELINE FUEL:	<u>92POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		REQUIREMENT				JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST 200/160	POST	POST		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8 200/160			200/160		
TENSILE (PSI)	2663/2130	2736	2820	1981	15				+34/+8	+38	+42	O/W	W	W
ELONGATION (%)	51/166	84	29	399	15				-87/-58	-79	-93	O/O	O	O
VOLUME SWELL (%)	-16/-11	-17	-17	N/A	N/A									
HARD’S; a) SHORE A (PTS)	100	100	100	65	N/A				+35	+35	+35	W	W	W
b) PENCIL														
COMP. SET (avg. 2 spcm’s)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)				C	C1	C	C1	C	C1					
ACID NO. mgKOH/gm				.001	.001	.001	.002	.003	.003		0.015			
GUMS mg/100ml				.6	.8	4.4	2.8	9.6	8.6		7			
HYDROPEROXIDES mM/l				.001	.002	0	.032	0	.018					
CONDUCTIVITY pS/m @72°F				100	66	248	131	912	410	150	600			
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>LL 7</u>	MATERIAL / IDENTITY:	<u>KYNAR, FUEL LINE CLAMPS, ETC.</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL TANKS</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>11 JULY 97</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)	0	0	0	N/A					P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	92	95	95	90					P	P	P	W	W	W
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)				C	C1	C	C1	C	C1					
ACID NO. mgKOH/gm				.001	.001	.001	.002	.003	.003		0.015			
GUMS mg/100ml				.6	.8	4.4	2.8	9.6	8.6		7			
HYDROPEROXIDES mM/l				.001	.002	0	.032	0	.018					
CONDUCTIVITY pS/m @72°F				100	66	248	131	912	410	150	600			
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>II. 8/I.B.11.14</u>	MATERIAL / IDENTITY:	<u>NYLON</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL SYSTEM BLADDER TANK STRUCURAL</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>See I.B.II-14</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)														
ACID NO. mgKOH/gm											0.015			
GUMS mg/100ml											7			
HYDROPEROXIDES mM/l														
CONDUCTIVITY pS/m @72°F										150	600			
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>11.9</u>	MATERIAL / IDENTITY:	<u>MAGNETIC WIRE, INSULATION TYPE I HML VARNISH</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>AIRFRAME / ENGINE, JOINING MATERIAL</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>2 Dec '97</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS					
	RESULTS						OBSERVATIONS AND REFERENCES	OVERALL EVALUATION				
	JP-8		JP-8 +100		JP8+100 (X4)			JP8	+100	X4		
	PRE	POST	PRE	POST	PRE	POST						
COLOR	L	I2	L	I2	L	I2	Varnish Present All Samples	CN	W	W		
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND		CN	W	W		
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND		CN	W	W		
AVG. WT. (gms)	.0921	.0922	.0828	.0830	.0966	.0967						
GAIN / LOSS (gms)		+.0001		+.0002		+.0001		CN	W	W		
MICROSCOPY EVAL.												

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8	TEST RESULTS		
							JP-8			JP-8 + 100		JP-8 + 100 x4		GENERAL OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		MIN / MAX	JP8	+100
	COLOR (7 DAYS)	C1	C2	C1	C2	C1	C2	C	C2	C	C2	C	C2		W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	283	9	382	71	616	315	50	4	300	57	569	150/600		O	O	O
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color: L = *Light (No Deposit)* L1 - L2 = *Discoloration/Deposits*
 Fuel Color: C = *Clear* C1 - C6 = *Light to Dark*
 Designations: NE = *Not Evaluated;* ND = *Not Detected;* BD = *Below Detection* P = *Pitting*
 Comparisons: W = *Within Allowable Requirement;* O = *Outside Allowable Requirement*
 OT = *Material Tested Beyond Temperature Range* CN = *Control*
 N/A = *Not applicable;* LT = *Less than 500 ppb*
 GT = *Greater than 500 ppb*
 NSR = *No Spec. Req. and/or 4 (x) Additive Concentration*

DATE: 24 MAR 98
 UDRI TECH: A. BEHME
 UTC ENG: J. LEONE
 UDRI P.I. ENG: D.H. KALT
 A.F. AUT. W./MLSA: L. PERKINS
 A.F. AUT. WL/POSF: S. A. ANDERSON

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.I. 10</u>	MATERIAL / IDENTITY:	<u>TEFLON / KAPTON (COMPOSITE) TEST METHOD SA 4373</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL TANK, WIRE, INSULATED ELECTRICAL</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /92 POSF 2926</u>
TEST DATE START:	<u>11 SEP 97</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
WET DIELECTRIC(mA)	350	450	350	<300					P	P	P	W	W	W

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS										
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		SPECIFICATION RANGE		GENERAL		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	FOR JP-8		OBSERVATIONS		
										MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)				C	C1	C	C1	C	C1					
ACID NO. mgKOH/gm				.001	.001	.001	.002	.003	.003		0.015			
GUMS mg/100ml				.6	.8	4.4	2.8	9.6	8.6		7			
HYDROPEROXIDES mM/l				.001	.002	0	.032	0	.018					
CONDUCTIVITY pS/m @72°F				100	66	248	131	912	410	150	600			
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
 Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
 W = Within Allowable Requirement; O = Outside Allowable Requirement
 OT = Material Tested Beyond Temperature Range
 N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
 UDRI TECH: J. DUES
 UDRI ENG: B. WILT
 UDRI P.I. ENG: D.H. KALT
 A.F. AUT. W./MLSE: A. FLETCHER
 A.F. AUT. WL/POSF: S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.I. 12</u>	MATERIAL / IDENTITY:	<u>TEFLON / WIRE TEST METHOD SA 4373</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL TANK, WIRE, INSULATED ELECTRICAL</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /92 POSF 2926</u>
TEST DATE START:	<u>11 SEP 97</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		REQUIREMENT				JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST		DECREASE	MIN VALUE	INCREASE	MAX VALUE						
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
WET DIELECTRIC(mA)	<300	<300	<300	<300					P	P	P	W	W	W

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) *F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)				C	C1	C	C1	C	C1					
ACID NO. mgKOH/gm				.001	.001	.001	.002	.003	.003		0.015			
GUMS mg/100ml				.6	.8	4.4	2.8	9.6	8.6		7			
HYDROPEROXIDES mM/l				.001	.002	0	.032	0	.018					
CONDUCTIVITY pS/m @72°F				100	66	248	131	912	410	150	600			
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J.DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF: S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.I. 13</u>	MATERIAL / IDENTITY:	<u>NYLON / WIRE, COAX SHEILD (mA)</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL TANK WIRE, INSULATE, ELECTRICAL</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /92POSF 2926</u>
TEST DATE START:	<u>11 SEP 97</u>	JP-8 BASELINE FUEL:	<u>92POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS						
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION			
	JP-8	JP-8 +100	JP8+100 (X4)		REQUIREMENT				JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4	
	POST	POST	POST		DECREASE	MIN VALUE	INCREASE	MAX VALUE							
TENSILE (PSI)															
ELONGATION (%)															
VOLUME SWELL (%)															
HARD’S; a) SHORE A (PTS)															
b) PENCIL															
COMP. SET (avg. 2 spcm’s)															
LAP SHEAR (PSI)															
COHESION (%)															
TAPE ADHESION (P/F)															
PEEL STRENGTH (LB/IN)															
LAMINAR SHEAR (PSI)															
RESISTIVITY (OHM-CM)															
TORQUE (INCH -LBS.)															
RUPTURE PRESS. (IN.HG)															
WET DIELECTRIC(mA)	<300	<300	<300	<300						P	P	P	W	W	W
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL											
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS											
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		SPECIFICATION RANGE			GENERAL		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	FOR JP-8		OBSERVATIONS			
										MIN	MAX	JP8	+100	X4	
COLOR (7 DAYS)				C	C1	C	C1	C	C1						
ACID NO. mgKOH/gm				.001	.001	.001	.002	.003	.003		0.015				
GUMS mg/100ml				.6	.8	4.4	2.8	9.6	8.6		7				
HYDROPEROXIDES mM/l				.001	.002	0	.032	0	.018						
CONDUCTIVITY pS/m @72°F				100	66	248	131	912	410	150	600				
VISUAL OBSERVATIONS															

NOTES:

Fuel Color:	C =	Clear	C1 - C6 = Light to Dark
Designations:	NE =	Not Evaluated;	ND = Not Detected;
	W =	Within Allowable Requirement;	O = Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	
	N/A =	Not applicable;	NSR = No Spec. Req. and/or 4 (x) Additive Concentration

DATE:	<u>24 MAR 98</u>
UDRI TECH:	<u>J. DUES</u>
UDRI ENG:	<u>B. WILT</u>
UDRI P.L. ENG:	<u>D.H. KALT</u>
A.F. AUT. W/MLSE:	<u>A. FLETCHER</u>
A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>IL 13.1</u>	MATERIAL / IDENTITY:	<u>NYLON / WIRE, COAX CENTER (mA)</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL TANK WIRE, INSULATE, ELECTRICAL</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /92POSF 2926</u>
TEST DATE START:	<u>11 SEP 97</u>	JP-8 BASELINE FUEL:	<u>92POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS						
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION			
	JP-8	JP-8 +100	JP8+100 (X4)		REQUIREMENT				JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4	
	POST	POST	POST		DECREASE	MIN VALUE	INCREASE	MAX VALUE							
TENSILE (PSI)															
ELONGATION (%)															
VOLUME SWELL (%)															
HARD’S; a) SHORE A (PTS)															
b) PENCIL															
COMP. SET (avg. 2 spcm’s)															
LAP SHEAR (PSI)															
COHESION (%)															
TAPE ADHESION (P/F)															
PEEL STRENGTH (LB/IN)															
LAMINAR SHEAR (PSI)															
RESISTIVITY (OHM-CM)															
TORQUE (INCH -LBS.)															
RUPTURE PRESS. (IN.HG)															
WET DIELECTRIC(mA)	<400	<400	<400	<400						P	P	P	W	W	W

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL											
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE			GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS			
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4	
COLOR (7 DAYS)				C	C1	C	C1	C	C1						
ACID NO. mgKOH/gm				.001	.001	.001	.002	.003	.003		0.015				
GUMS mg/100ml				.6	.8	4.4	2.8	9.6	8.6		7				
HYDROPEROXIDES mM/l				.001	.002	0	.032	0	.018						
CONDUCTIVITY pS/m @72°F				100	66	248	131	912	410	150	600				
VISUAL OBSERVATIONS															

NOTES:

Fuel Color:	C =	Clear	C1 - C6 = Light to Dark
Designations:	NE =	Not Evaluated;	ND = Not Detected;
	W =	Within Allowable Requirement;	O = Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	
	N/A =	Not applicable;	NSR = No Spec. Req. and/or 4 (x) Additive Concentration

DATE:	<u>24 MAR 98</u>
UDRI TECH:	<u>J. DUES</u>
UDRI ENG:	<u>B. WILT</u>
UDRI P.L. ENG:	<u>D.H. KALT</u>
A.F. AUT. W./MLSE:	<u>A. FLETCHER</u>
A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.J.I</u>	MATERIAL / IDENTITY:	<u>2219-T87 ALUMINUM, WELDED UNS A 92319/419ID (AMS)</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME / ENGINE, JOINING MATERIAL</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>5 DEC '96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS					
	RESULTS						OBSERVATIONS AND REFERENCES	OVERALL EVALUATION				
	JP-8		JP-8 +100		JP8+100 (X4)			JP8	+100	X4		
	PRE	POST	PRE	POST	PRE	POST						
COLOR	L	L1	L	L1	L	L1	Minimum Discoloration / Deposits All Samples	CN	W	W		
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND		CN	W	W		
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND		CN	W	W		
AVG. WT. (gms)	6.7790	6.7775	6.5744	6.5740	6.8447	6.8445						
GAIN / LOSS (gms)		-.0005		-.0004		-.0002		CN	W	W		
MICROSCOPY EVAL.												

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL		
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
	COLOR (7 DAYS)	C1	C1	C1	C1	C1	C1	C	C1	C	C	C		C		W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	254	96	584	448	904	863	298	90	257	233	608	272	150/600	W	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	ND	NE	ND	NE	ND	NE		NE		NE			NE	NE	NE
	NE	50	NE	50	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	<u>24 APR 98</u>
UDRI TECH:	<u>A. BEHME</u>
UTC ENG:	<u>J. LEONE</u>
UDRI P.I. ENG:	<u>D.H. KALT</u>
A.F. AUT. W./MLSA:	<u>L. PERKINS</u>
A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>IJ.2</u>	MATERIAL / IDENTITY:	<u>6 AL-4V (Ti) WELDED MATCH FILL</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>AIRFRAME / ENGINE, JOINING MATERIAL</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>1 NOV '95</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS					
	RESULTS						OBSERVATIONS AND REFERENCES	OVERALL EVALUATION				
	JP-8		JP-8 +100		JP8+100 (X4)			JP8	+100	X4		
	PRE	POST	PRE	POST	PRE	POST						
COLOR	L	L	L	L	L	L	DISCOLORATION ON JP-8 SAMPLE / SURFACE DEPOSITS – ALL SAMPLES	CN	W	W		
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND		CN	W	W		
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	MINIMUM PITTING – ALL SAMPLES	CN	W	W		
AVG. WT. (gms)	9.1543	9.1545	9.1827	9.1827	9.1595	9.1593						
GAIN / LOSS (gms)		+.0002		..0000		-.0002		CN	W	W		
MICROSCOPY EVAL.												

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8	TEST RESULTS		
							JP-8		JP-8 + 100		JP-8 + 100 x4			GENERAL OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		MIN / MAX	JP8	+100
	COLOR (7 DAYS)	C1	C4	C1	C4	C1	C4	C	C2	C	C2	C	C2		O	O
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	121	41	327	105	572	389	108	123	248	141	912	555	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Ti	7	7	10	14	10	7	NE		NE		NE			NE	NE	NE
Al	40	NE	50	NE	70	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color: L = *Light (No Deposit)* L1 - L2 = *Discoloration/Deposits*
 Fuel Color: C = *Clear* C1 - C6 = *Light to Dark*
 Designations: NE = *Not Evaluated;* ND = *Not Detected;* BD = *Below Detection* P = *Pitting*
 Comparisons: W = *Within Allowable Requirement;* O = *Outside Allowable Requirement*
 OT = *Material Tested Beyond Temperature Range* CN = *Control*
 N/A = *Not applicable;* LT = *Less than 500 ppb*
 GT = *Greater than 500 ppb*
 NSR = *No Spec. Req. and/or 4 (x) Additive Concentration*

DATE: 24 APR 98
 UDRI TECH: A. BEHME
 UTC ENG: J. LEONE
 UDRI P.I. ENG: D.H. KALT
 A.F. AUT. W./MLSA: L. PERKINS
 A.F. AUT. WL/POSF: S. A. ANDERSON

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.J.3</u>	MATERIAL / IDENTITY:	<u>3AL-2.5SV (Ti), WELDED, MATCH FILL</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>AIRFRAME / ENGINE, JOINING MATERIAL</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>14 MAR '96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST	Discoloration JP-8 Samples only	JP8	+100	X4					
	L	L2	L	L1	L	L1		CN	W	W					
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND		CN	W	W					
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND		CN	W	W					
AVG. WT. (gms)	9.7992	9.7991	9.8102	9.8102	9.7585	9.7584									
GAIN / LOSS (gms)		+.0005		+.0004		+.0002		CN	W	W					
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL						SPEC. RANGE FOR JP-8	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)							GENERAL OBSERVATIONS		
	JP-8		JP-8 + 100		JP-8 + 100 x4		MIN / MAX	JP8	+100	X4						
	7	28	7	28	7	28		PRE	POST	PRE	POST	PRE		POST		
COLOR (7 DAYS)	C3	C4	C3	C4	C3	C4	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	104	42	434	96	789	356	108	38	248	131	912	410	150/600	O	W	O
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	11	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	ND	NE	ND	NE	ND	NE	NE		NE		NE			NE	NE	NE
	ND	NE	ND	NE	ND	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

DATE:	<u>24 APR 98</u>
UDRI TECH:	<u>A. BEHME</u>
UTC ENG:	<u>J. LEONE</u>
UDRI P.I. ENG:	<u>D.H. KALT</u>
A.F. AUT. W./MLSA:	<u>L. PERKINS</u>
A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.J.4</u>	MATERIAL / IDENTITY:	<u>INCO 718 NICKEL, WELDED MATCH FILL</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME / ENGINE, JOINING MATERIAL</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>10 MAY 95</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4						
	COLOR	L	LI	L	LI	L	LI	CN	W	W					
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	CN	W	W						
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND	CN	W	W						
AVG. WT. (gms)	18.0334	18.0336	17.8698	17.8717	18.0578	18.0579									
GAIN / LOSS (gms)		+0.0002		+0.0019		+0.0001	CN	W	W						
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL						SPEC. RANGE FOR JP-8	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)							GENERAL OBSERVATIONS		
	JP-8		JP-8 + 100		JP-8 + 100 x4		JP8	+100	X4							
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		MIN / MAX	JP8	+100
COLOR (7 DAYS)	C1	C1	C1	C1	C1	C1	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	147	60	300	345	572	533	108	38	248	131	912	410	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	ND	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color: L = *Light (No Deposit)* L1 - L2 = *Discoloration/Deposits*
 Fuel Color: C = *Clear* C1 - C6 = *Light to Dark*
 Designations: NE = *Not Evaluated;* ND = *Not Detected;* BD = *Below Detection* P = *Pitting*
 Comparisons: W = *Within Allowable Requirement;* O = *Outside Allowable Requirement*
 OT = *Material Tested Beyond Temperature Range* CN = *Control*
 N/A = *Not applicable;* LT = *Less than 500 ppb*
 GT = *Greater than 500 ppb*
 NSR = *No Spec. Req. and/or 4 (x) Additive Concentration*

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

DATE: 24 APR 98
 UDRI TECH: A. BEHME
 UTC ENG: J. LEONE
 UDRI P.I. ENG: D.H. KALT
 A.F. AUT. W./MLSA: L. PERKINS
 A.F. AUT. WL/POSF: S. A. ANDERSON

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.J.4</u>	MATERIAL / IDENTITY:	<u>INCO 718 NICKEL, WELDED, MATCH FILL</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>AIRFRAME / ENGINE, JOINING MATERIAL</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>10 MAY '95</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS										
	RESULTS						OBSERVATIONS AND REFERENCES								OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)												
	PRE	POST	PRE	POST	PRE	POST	Discoloration / Deposits All Samples	JP8	+100	X4							
	L	L2	L	L2	L	L2											
COLOR	ND	ND	ND	ND	ND	ND					CN	W	W				
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND					CN	W	W				
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND	CN	W	W								
AVG. WT. (gms)	18.1786	18.1790	18.1780	18.1784	17.9868	17.9869											
GAIN / LOSS (gms)		0..0004		0..0004		0..0001		CN	W	W							
MICROSCOPY EVAL.																	

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)							GENERAL		
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
COLOR (7 DAYS)	C3	C4	C3	C4	C3	C3	C	C2	C	C2	C	C2	O	O	W	
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	135	33	257	51	481	201	108	123	248	141	912	555	150/600	O	O	O
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color: L = *Light (No Deposit)* L1 - L2 = *Discoloration/Deposits*
 Fuel Color: C = *Clear* C1 - C6 = *Light to Dark*
 Designations: NE = *Not Evaluated;* ND = *Not Detected;* BD = *Below Detection* P = *Pitting*
 Comparisons: W = *Within Allowable Requirement;* O = *Outside Allowable Requirement*
 OT = *Material Tested Beyond Temperature Range* CN = *Control*
 N/A = *Not applicable;* LT = *Less than 500 ppb*
 GT = *Greater than 500 ppb*
 NSR = *No Spec. Req. and/or 4 (x) Additive Concentration*

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

DATE: 24 APR 98
 UDRI TECH: A. BEHME
 UTC ENG: J. LEONE
 UDRI P.I. ENG: D.H. KALT
 A.F. AUT. W./MLSA: L. PERKINS
 A.F. AUT. WL/POSF: S. A. ANDERSON

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>IJ.5</u>	MATERIAL / IDENTITY:	<u>INCO 625 NICKEL, WELDED, MATCH FILL</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>AIRFRAME / ENGINE, JOINING MATERIAL</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>5 DEC '96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST	Discoloration All Samples	JP8	+100	X4					
	COLOR	L	L2	L	L2	L		L2	CN	W	W				
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND		CN	W	W					
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND		CN	W	W					
AVG. WT. (gms)	18.2886	18.2883	18.0096	18.0091	18.1323	18.1322									
GAIN / LOSS (gms)		~.0003		~.0005		~.0001		CN	W	W					
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8	TEST RESULTS		
							GENERAL OBSERVATIONS									
	JP-8		JP-8 + 100		JP-8 + 100 x4		MIN / MAX	JP8	+100	X4						
	PRE	POST	PRE	POST	PRE	POST										
COLOR (7 DAYS)	C2	C5	C2	C4	C1	C2	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	186	125	506	212	898	1270	50	4	300	57	569	241	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Ni	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
Fe	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
Al	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

DATE:	<u>24 APR 98</u>
UDRI TECH:	<u>A. BEHME</u>
UTC ENG:	<u>J. LEONE</u>
UDRI P.I. ENG:	<u>D.H. KALT</u>
A.F. AUT. W./MLSA:	<u>L. PERKINS</u>
A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.J.6</u>	MATERIAL / IDENTITY:	<u>321 S.S. (FERROUS) WELDED, MATCH FILL</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME / ENGINE, JOINING MATERIAL</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>10 MAY '95</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST	Discoloration / Deposits All Samples	JP8	+100	X4					
	L	I2	L	I2	L	I2		CN	W	W					
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND		CN	W	W					
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND		CN	W	W					
AVG. WT. (gms)	17.5551	17.5551	17.5494	17.5496	17.4211	17.4211									
GAIN / LOSS (gms)		.0000		+.0002		.0000		CN	W	W					
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL						SPEC. RANGE FOR JP-8	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)							GENERAL OBSERVATIONS		
	JP-8		JP-8 + 100		JP-8 + 100 x4		MIN / MAX	JP8	+100	X4						
	7	28	7	28	7	28		PRE	POST	PRE	POST	PRE		POST		
COLOR (7 DAYS)	C1	C1	C1	C1	C1	C1	C	C1	C	C1	C	C1		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	146	60	304	235	568	439	108	39	248	131	912	410	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

DATE:	<u>24 APR 98</u>
UDRI TECH:	<u>A. BEHME</u>
UTC ENG:	<u>J. LEONE</u>
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A.F. AUT. W./MLSA:	<u>L. PERKINS</u>
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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.J.6</u>	MATERIAL / IDENTITY:	<u>321 S.S. (FERROUS) WELDED, MATCH FILL</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>AIRFRAME / ENGINE, JOINING MATERIAL</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>10 MAY '95</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	I2	L	I2	L	I2	DISCOLORATION/DEPOSITS ALL SAMPLES						CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND							CN	W	W
AVG. WT. (gms)	17.5519	17.5514	17.4950	17.4921	17.6291	17.6291									
GAIN / LOSS (gms)		.0005		+.0029		.0000							CN	W	W
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)							GENERAL OBSERVATIONS		
							JP-8		JP-8 + 100		JP-8 + 100 x4					
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
COLOR (7 DAYS)	C2	C4	C2	C4	C2	C4	C	C2	C	C2	C	C2		O	O	O
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	152	34	295	200	559	290	108	123	248	141	912	555	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	<u>24 APR 98</u>
UDRI TECH:	<u>A. BEHME</u>
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A.F. AUT. W./MLSA:	<u>L. PERKINS</u>
A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>IJ.7</u>	MATERIAL / IDENTITY:	<u>IN 200 / 201 NICKEL, WELDED, MATCH FILL</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>AIRFRAME / ENGINE, JOINING MATERIAL</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>4 OCT 95</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST	Discoloration All Samples	JP8	+100	X4					
	COLOR	L	I2	L	I2	L					I2				
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND					CN	W	W		
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND					CN	W	W		
AVG. WT. (gms)	19.6198	19.6195	19.4001	19.3993	19.8395	19.8389									
GAIN / LOSS (gms)		-.0003		-.0008		-.0006		CN	W	W					
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL						SPEC. RANGE FOR JP-8	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)							GENERAL OBSERVATIONS		
	JP-8		JP-8 + 100		JP-8 + 100 x4		JP8	+100	X4							
	7	28	7	28	7	28				PRE	POST	PRE		POST	PRE	POST
COLOR (7 DAYS)	C2		C3		C4		C	C2	C	C2	C	C2		W	W	O
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	127	36	347	168	584	440	108	123	248	141	912	555	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	120	950	610	1350	1110	1620	NE		NE		NE			NE	NE	NE
	1	1	2	1	3	2	NE		NE		NE			NE	NE	NE
	25	10	60	55	135	65	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

DATE: 24 APR 98
UDRI TECH: A. BEHME
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UDRI P.I. ENG: D.H. KALT
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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>IJ.8</u>	MATERIAL / IDENTITY:	<u>IN 200 / 201, WELDED BNI (5 OR 6)</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>JOINING MATERIAL</u>
EXPOSURE TIME (DAYS)	<u>29</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 93 POSF 2980)</u>
TEST DATE START:	<u>5 DEC '96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS									
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION			
	JP-8		JP-8 +100		JP8+100 (X4)											
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4	
	COLOR	L	I2	L	I2	L	I2	Discoloration / Deposits All Samples						CN	W	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W	
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND							CN	W	W	
AVG. WT. (gms)	18,1840	18.1830	17.8898	17.8889	17.8250	17.8235										
GAIN / LOSS (gms)		-.0010		-.0009		-.0015							CN	W	W	
MICROSCOPY EVAL.																
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL		
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
	COLOR (7 DAYS)	C2	C5	C2	C5	C2	C2	C	C2	C	C2	C	C2		W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	234	108	582	189	889	1431	50	4	300	57	569	241	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

DATE:	<u>24 APR 98</u>
UDRI TECH:	<u>A. BEHME</u>
UTC ENG:	<u>J. LEONE</u>
UDRI P.I. ENG:	<u>D.H. KALT</u>
A.F. AUT. W./MLSA:	<u>L. PERKINS</u>
A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>IJ.9</u>	MATERIAL / IDENTITY:	<u>WASPALLOY (NI), BRAZED AMS 4786 Au</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>AIRFRAME, ENGINE JOINING MATERIAL</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>5 DEC '96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS									
	RESULTS						OBSERVATIONS AND REFERENCES							OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)											
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4							
	COLOR	L	L1	L	L1	L	L1	MINIMUM DISCOLORATION AND DEPOSITS ALL SAMPLES							CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND								CN	W	W
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND								CN	W	W
AVG. WT. (gms)	17.4513	17.4452	17.6879	17.6793	17.5065	17.4976										
GAIN / LOSS (g ms)		.0061		-.0086		-.0089								CN	W	W
MICROSCOPY EVAL.																

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL						SPEC. RANGE FOR JP-8	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)							GENERAL OBSERVATIONS		
	JP-8		JP-8 + 100		JP-8 + 100 x4		JP8	+100	X4							
	PRE	POST	PRE	POST	PRE	POST				MIN / MAX						
COLOR (7 DAYS)	C2	C4	C5	C5	C2	C4	C	C2	C	C2	C	C2				
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	215	45	425	87	682	315	50	4	300	57	569	241	150/600			
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	20	NE	70	NE	100	NE	NE		NE		NE			NE	NE	NE
	ND	NE	30	NE	50	NE	NE		NE		NE			NE	NE	NE
	110	NE	100	NE	80	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	P =	Pitting
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

DATE:	<u>24 APR 98</u>
UDRI TECH:	<u>A. BEHME</u>
UTC ENG:	<u>J. LEONE</u>
UDRI P.I. ENG:	<u>D.H. KALT</u>
A.F. AUT. W./MLSA:	<u>L. PERKINS</u>
A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	I.J.10	MATERIAL / IDENTITY:	321 STAINLESS STEEL BRAZED, B Ag 5
TEST TEMPERATURE (°F)	325	USE:	ENGINE FUEL LINES & COMPONENTS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	13 FEB 97	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4						
	COLOR	L	I2	L	LI	L	LI	CN	W	W					
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	CN	W	W						
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND	CN	W	W						
AVG. WT. (gms)	16.0113	16.0098	16.6320	16.6303	16.4479	16.4463									
GAIN / LOSS (gms)		-.0015		-.0017		-.0016	CN	W	W						
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL						SPEC. RANGE FOR JP-8	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)							GENERAL OBSERVATIONS		
	JP-8		JP-8 + 100		JP-8 + 100 x4		JP8	+100	X4							
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		MIN / MAX	JP8	+100
COLOR (7 DAYS)	C3	C3	C3	C3	C2	C3	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	231	114	426	115	684	380	50	4	300	57	569	241	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	200	500	400	400	400	600	NE		NE		NE			NE	NE	NE
	<100	<100	<100	<100	<100	<100	NE		NE		NE			NE	NE	NE
	<100	<100	<100	<100	<100	<100	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	24 APR 98
UDRI TECH:	A. BEHME
UTC ENG:	J. LEONE
UDRI P.I. ENG:	D.H. KALT
A.F. AUT. W./MLSA:	L. PERKINS
A.F. AUT. WL/POSF	S. A. ANDERSON

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.J.11</u>	MATERIAL / IDENTITY:	<u>B-36 21A QQ-S-571 Sn 60, Pb 40 SOLDER SPOTS</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>JOINING MATERIAL</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>13 FEB 97</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS									
	RESULTS						OBSERVATIONS AND REFERENCES							OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)											
	PRE	POST	PRE	POST	PRE	POST	Discoloration / Deposits All Samples	JP8	+100	X4						
	L	L1	L	L1	L	L1		CN	W	W						
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND		CN	W	W						
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND		CN	W	W						
AVG. WT. (gms)	8.0805	8.0800	8.0956	8.0908	8.1084	8.0867										
GAIN / LOSS (gms)		-.0005		-.0044		-.0217		CN	W	W						
MICROSCOPY EVAL.																

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL						SPEC. RANGE FOR JP-8	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)							GENERAL OBSERVATIONS		
	JP-8		JP-8 + 100		JP-8 + 100 x4		MIN / MAX	JP8	+100	X4						
	7	28	7	28	7	28		PRE	POST	PRE	POST	PRE		POST	JP8	+100
COLOR (7 DAYS)	C3	C2	C3	C3	C3	C2	C	C1	C	C1	C	C1		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	153	103	468	408	696	1073	50	4	300	57	569	241	150/600	O	O	O
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
			P =	Pitting
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

DATE:	<u>24 MAR 98</u>
UDRI TECH:	<u>A. BEHME</u>
UTC ENG:	<u>J. LEONE</u>
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A.F. AUT. W./MLSA:	<u>L. PERKINS</u>
A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.J.11</u>	MATERIAL / IDENTITY:	<u>B36 21A COPPER(W), QQ-S-571, SN60,Pb40, SOLDER SPOTS</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>AIRFRAME / ENGINE, JOINING MATERIAL</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>19 JAN 96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	LI	L	LI	L	LI	CN	W	W					
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	CN	W	W						
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND	OT	OT	OT						
AVG. WT. (gms)	8.0787	8.0687	8.0476	8.0397	7.9830	7.9749	Lead Rich Banding Near Interface of Solder and Base Metal – Tested Above Temp.								
GAIN / LOSS (gms)		-.0100		-.0079		-.0081	Range for 60 Sn / 40 Pb Solder / Retest at Lower Temp. (200F)								
MICROSCOPY EVAL.								OT	OT	OT					

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL						SPEC. RANGE FOR JP-8	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)							GENERAL OBSERVATIONS		
	JP-8		JP-8 + 100		JP-8 + 100 x4		JP8	+100	X4							
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		MIN / MAX		
COLOR (7 DAYS)	C3	C4	C3	C4	C3	C4	C	C1	C	C1	C	C1		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	103	13	481	77	745	327	108	123	248	141	912	555	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	350	305	2220	2950	4700	3300	NE		NE		NE			W	O	O
	40	80	40	90	38	85	NE		NE		NE			W	W	W
	ND	ND	ND	ND	ND	ND	NE		NE		NE			W	W	W
	15	16	100	72	367	63	NE		NE		NE			W	W	W

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	<u>24 APR 98</u>
UDRI TECH:	<u>A. BEHME</u>
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A.F. AUT. W./MLSA:	<u>L. PERKINS</u>
A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	I.J.12	MATERIAL / IDENTITY:	6061 T6 DIP BRAZE, GRADE B, TYPE V MIL-B-7883
TEST TEMPERATURE (°F)	200	USE:	JOINING MATERIAL
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	13 FEB 97	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	L1	L	L1	L	L1	CN	W	W					
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	CN	W	W						
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND	CN	W	W						
AVG. WT. (gms)	6.0071	6.0072	5.9853	5.9853	6.0621	6.0620									
GAIN / LOSS (gms)		+.0001		.0000		-.0001	CN	W	W						
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL						SPEC. RANGE FOR JP-8	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)							GENERAL OBSERVATIONS		
	JP-8		JP-8 + 100		JP-8 + 100 x4		JP8	+100	X4							
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST	MIN / MAX	JP8	+100	X4
COLOR (7 DAYS)	C2	C2	C1	C1	C1	C1	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	241	144	421	342	694	573	50	4	300	57	569	241	150/600	O	O	O
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color: L = *Light (No Deposit)* L1 - L2 = *Discoloration/Deposits*
 Fuel Color: C = *Clear* C1 - C6 = *Light to Dark*
 Designations: NE = *Not Evaluated;* ND = *Not Detected;* BD = *Below Detection* P = *Pitting*
 Comparisons: W = *Within Allowable Requirement;* O = *Outside Allowable Requirement*
 OT = *Material Tested Beyond Temperature Range* CN = *Control*
 N/A = *Not applicable;* LT = *Less than 500 ppb*
 GT = *Greater than 500 ppb*
 NSR = *No Spec. Req. and/or 4 (x) Additive Concentration*

DATE: 24 MAR 98
 UDRI TECH: A. BEHME
 UTC ENG: J. LEONE
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 A.F. AUT. W./MLSA: L. PERKINS
 A.F. AUT. WL/POSF: S. A. ANDERSON

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	I.J.13	MATERIAL / IDENTITY:	Ti, Cu, Ni, BRAZE
TEST TEMPERATURE (°F)	325	USE:	AIRFRAME / ENGINE, JOINING MATERIAL
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	18 OCT 95	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	L	L	L	L	L	Minimum Surface Deposits All Samples						CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	CN							W	W
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND	CN							W	W
AVG. WT. (gms)	11.3084	11.3086	11.3231	11.3231	11.3304	11.3304									
GAIN / LOSS (gms)		+.0002		.0000		.0000						CN	W	W	
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL						SPEC. RANGE FOR JP-8	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)							GENERAL OBSERVATIONS		
	JP-8		JP-8 + 100		JP-8 + 100 x4		JP8	+100	X4							
	7	28	7	28	7	28				PRE	POST	PRE		POST	PRE	POST
COLOR (7 DAYS)	C1	C2	C1	C2	C1	C2	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	83	7	530	245	417	526	108	123	248	141	912	555	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	ND	15	ND	15	ND	32	NE		NE		NE			NE	NE	NE
	4	7	18	20	32	11	NE		NE		NE			NE	NE	NE
	10	ND	17	2	19	40	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

DATE:	24 APR 98
UDRI TECH:	A. BEHME
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UDRI P.I. ENG:	D.H. KALT
A.F. AUT. W./MLSA:	L. PERKINS
A.F. AUT. WL/POSF	S. A. ANDERSON

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	I.J.14	MATERIAL / IDENTITY:	6061-T6 ALUMINUM, WELDED with 4043 FILLER
TEST TEMPERATURE (°F)	200	USE:	AIRFRAME / ENGINE, JOINING MATERIAL
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	5 DEC '96	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4						
	COLOR	L	LI	L	LI	L	LI	Surface Deposits All Samples						CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	Minimum Pitting All Samples						CN	W	W
AVG. WT. (gms)	5.9033	5.9028	5.8586	5.8583	5.9602	5.9608									
GAIN / LOSS (gms)		-.0005		-.0003		+.0006							CN	W	W
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
														GENERAL		
	JP-8		JP-8 + 100		JP-8 + 100 x4									OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
COLOR (7 DAYS)	C1	C1	C1	C1	C1	C1	C	C1	C	C1	C	C1		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	234	107	585	334	868	862	108	39	248	131	912	410	150/600	O	O	O
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	24 APR 98
UDRI TECH:	A. BEHME
UTC ENG:	J. LEONE
UDRI P.I. ENG:	D.H. KALT
A.F. AUT. W./MLSA:	L. PERKINS
A.F. AUT. WL/POSF	S. A. ANDERSON

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.J.14</u>	MATERIAL / IDENTITY:	<u>6061-T6 ALUMINUM, WELDED with 4043 FILLER</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>AIRFRAME / ENGINE, JOINING MATERIAL</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>1 NOV 95</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	LI	L	LI	L	LI	Discoloration / Deposits All Samples						CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND							CN	W	W
AVG. WT. (gms)	5.8784	5.8698	5.6562	5.6564	5.9747	5.9745									
GAIN / LOSS (gms)		-.0086		+.0002		-.0002							CN	W	W
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL						SPEC. RANGE FOR JP-8	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)							GENERAL OBSERVATIONS		
							JP-8		JP-8 + 100		JP-8 + 100 x4					
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST	MIN / MAX	JP8	+100	X4
COLOR (7 DAYS)	C2	C4	C3	C5	C3	C4	C	C2	C	C2	C	C2		O	O	O
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	171	132	409	225	681	686	108	123	248	141	912	555	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	50	NE	90	NE	130	NE	NE		NE		NE			NE	NE	NE
	ND	NE	10	NE	20	NE	NE		NE		NE			NE	NE	NE
	10	NE	30	NE	70	NE	NE		NE		NE			NE	NE	NE
	140	NE	130	NE	100	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

DATE:	<u>24 APR 98</u>
UDRI TECH:	<u>A. BEHME</u>
UTC ENG:	<u>J. LEONE</u>
UDRI P.I. ENG:	<u>D.H. KALT</u>
A.F. AUT. W./MLSA:	<u>L. PERKINS</u>
A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	I.J.15	MATERIAL / IDENTITY:	5052 H34 WELDED TO 6061-T6 WITH 5356 FILLER
TEST TEMPERATURE (°F)	200	USE:	AIRFRAME / ENGINE, JOINING MATERIAL
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /92 POSF 2926
TEST DATE START:	14 AUG 97	JP-8 BASELINE FUEL:	92 POSF 2926 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	LI	L	LI	L	LI	CN	W	W					
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	CN	W	W						
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND	CN	W	W						
AVG. WT. (gms)	11.4976	11.4983	11.4854	11.4855	11.6131	11.6133									
GAIN / LOSS (gms)		+0.0007		+0.0001		+0.0002	CN	W	W						
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL						SPEC. RANGE FOR JP-8	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)							GENERAL OBSERVATIONS		
	JP-8		JP-8 + 100		JP-8 + 100 x4		JP8	+100	X4							
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		MIN / MAX		
COLOR (7 DAYS)	C1	C1	C1	C1	C1	C1	C	C2	C	C2	C	C2	W	W	W	
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	272	139	408	283	620	515	50	4	300	57	569	241	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color: L = *Light (No Deposit)* L1 - L2 = *Discoloration/Deposits*
 Fuel Color: C = *Clear* C1 - C6 = *Light to Dark*
 Designations: NE = *Not Evaluated;* ND = *Not Detected;* BD = *Below Detection* P = *Pitting*
 Comparisons: W = *Within Allowable Requirement;* O = *Outside Allowable Requirement*
 OT = *Material Tested Beyond Temperature Range* CN = *Control*
 N/A = *Not applicable;* LT = *Less than 500 ppb*
 GT = *Greater than 500 ppb*
 NSR = *No Spec. Req. and/or 4 (x) Additive Concentration*

DATE: 24 APR 98
 UDRI TECH: A. BEHME
 UTC ENG: J. LEONE
 UDRI P.I. ENG: D.H. KALT
 A.F. AUT. W./MLSA: L. PERKINS
 A.F. AUT. WL/POSF S. A. ANDERSON

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.J.16</u>	MATERIAL / IDENTITY:	<u>Sn 95, Sh 05 SOLDER ON B 36-21A</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>JOINING MATERIAL</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /92 POSF 2926</u>
TEST DATE START:	<u>18 SEP 97</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS										
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION				
	JP-8		JP-8 +100		JP8+100 (X4)												
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4		
	COLOR	L	I2	L	LI	L	I2						CN	W	W		
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W		
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND							CN	W	W		
AVG. WT. (gms)	17.2023	17.1989	17.1897	17.1872	17.3015	17.3002											
GAIN / LOSS (gms)		-.0034		-.0025		-.0013							CN	W	W		
MICROSCOPY EVAL.																	
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL			
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS			
							PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4	
	COLOR (7 DAYS)	C1	C2	C1	C2	C1	C1	C	C2	C	C2	C	C2		W	W	W
	CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	228	105	385	423	599	807	50	4	300	57	569	241	150/600	O	W	W	
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY											
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

DATE:	<u>24 APR 98</u>
UDRI TECH:	<u>A. BEHME</u>
UTC ENG:	<u>J. LEONE</u>
UDRI P.I. ENG:	<u>D.H. KALT</u>
A.F. AUT. W./MLSA:	<u>L. PERKINS</u>
A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	I.K.1.1	MATERIAL / IDENTITY:	COVER, INK STAMP, COATINGS, TOP COATING, QQ-A-25011
TEST TEMPERATURE (°F)	200	USE:	AIRFRAME, FUEL SYSTEM NAME TAGS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	27 AUG '96	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS						
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION			
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4	
	POST	POST	POST												
TENSILE (PSI)															
ELONGATION (%)															
VOLUME SWELL (%)															
HARD'S; a) SHORE A (PTS)															
b) PENCIL															
COMP. SET (avg. 2 spcm's)															
LAP SHEAR (PSI)															
COHESION (%)															
TAPE ADHESION (P/F)															
PEEL STRENGTH (LB/IN)															
LAMINAR SHEAR (PSI)															
RESISTIVITY (OHM-CM)															
TORQUE (INCH -LBS.)															
RUPTURE PRESS. (IN.HG)															
WET DIELECTRIC(mA)	P	P	P	P	P					P	P	P	W	W	W

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL											
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS											
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4							
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4	
COLOR (7 DAYS)	C1	C1	C1	C	C1	C	CC1	C	C1			W	W	W	
ACID NO. mgKOH/gm	.005	.004	.007	0.001	0.004	0.001	0.003	0.003	0.003		0.015	W	W	W	
GUMS mg/100ml	2.0	6.4	17.8	2	3.2	4.4	4.8	9.6	3.8		7	W	W	O	
HYDROPEROXIDES mM/l	.01	.02	.02	.004	0.01	0	0.01	0	0.01			W	W	W	
CONDUCTIVITY pS/m @72°F	112	323	547	108	39	248	131	912	410	150	600	O	W	W	
VISUAL OBSERVATIONS															

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF: S.A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.K.1.2</u>	MATERIAL / IDENTITY:	<u>COVER, INK STAMP, COATINGS, TOP COATING, QQ-A-25011</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL SYSTEM NAME TAGS</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>27 AUG '96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS						
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION			
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4	
	POST	POST	POST												
TENSILE (PSI)															
ELONGATION (%)															
VOLUME SWELL (%)															
HARD’S; a) SHORE A (PTS)															
b) PENCIL															
COMP. SET (avg. 2 spcm’s)															
LAP SHEAR (PSI)															
COHESION (%)															
TAPE ADHESION (P/F)															
PEEL STRENGTH (LB/IN)															
LAMINAR SHEAR (PSI)															
RESISTIVITY (OHM-CM)															
TORQUE (INCH -LBS.)															
RUPTURE PRESS. (IN.HG)															
WET DIELECTRIC(mA)	P	P	P	P	P					P	P	P	W	W	W

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C2	C1	C1	C	C1	C	C1	C	C1			W	W	W
ACID NO. mgKOH/gm	.004	.004	.006	.001	.004	.001	0.003	0.003	0.003		0.015	W	W	W
GUMS mg/100ml	2.0	6.2	17.8	2	3.2	4.4	4.8	9.6	3.8		7	W	W	O
HYDROPEROXIDES mM/l	.02	.01	.01	.004	0.01	0	0.01	0	0.01			W	W	W
CONDUCTIVITY pS/m @72°F	119	329	582	108	39	248	131	912	410	150	600	W	W	W
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.K.1.3</u>	MATERIAL / IDENTITY:	<u>COVER INK STAMP, COATINGS, QQ-B-25011</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL SYSTEM, COMP COATINGS</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>27 AUG '96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS						
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION			
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4	
	POST	POST	POST												
TENSILE (PSI)															
ELONGATION (%)															
VOLUME SWELL (%)															
HARD’S; a) SHORE A (PTS)															
b) PENCIL															
COMP. SET (avg. 2 spcm’s)															
LAP SHEAR (PSI)															
COHESION (%)															
TAPE ADHESION (P/F)															
PEEL STRENGTH (LB/IN)															
LAMINAR SHEAR (PSI)															
RESISTIVITY (OHM-CM)															
TORQUE (INCH -LBS.)															
RUPTURE PRESS. (IN.HG)															
WET DIELECTRIC(mA)	P	P	P	P		P				P	P	P	W	W	W

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C2	C1	C1	C	C1	C	C1	C	C1			W	W	W
ACID NO. mgKOH/gm	.004	.003	.007	.001	.004	.001	.003	.003	.003		0.015	W	W	W
GUMS mg/100ml	2.0	5.4	17.8	2	3.2	4.4	4.8	9.6	3.8		7	W	W	O
HYDROPEROXIDES mM/l	.01	.01	.01	.004	.01	0	0.01	0	0.01			W	W	W
CONDUCTIVITY pS/m @72°F	114	395	552	108	39	248	131	912	410	150	600	O	W	W
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
 Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
 W = Within Allowable Requirement; O = Outside Allowable Requirement
 OT = Material Tested Beyond Temperature Range
 N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
 UDRI TECH: J. DUES
 UDRI ENG: B. WILT
 UDRI P.L. ENG: D.H. KALT
 A.F. AUT. W./MLSE: A. FLETCHER
 A.F. AUT. WL/POSF: S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.K.4</u>	MATERIAL / IDENTITY:	<u>NAME PLATE, QQA-250/1, COLOR A11136, FED, STD,-596</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL SYSTEM NAME TAG COATINGS</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>27 AUG '96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS						
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION			
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4	
	POST	POST	POST												
TENSILE (PSI)															
ELONGATION (%)															
VOLUME SWELL (%)															
HARD'S; a) SHORE A (PTS)															
b) PENCIL															
COMP. SET (avg. 2 spcm's)															
LAP SHEAR (PSI)															
COHESION (%)															
TAPE ADHESION (P/F)															
PEEL STRENGTH (LB/IN)															
LAMINAR SHEAR (PSI)															
RESISTIVITY (OHM-CM)															
TORQUE (INCH -LBS.)															
RUPTURE PRESS. (IN.HG)															
WET DIELECTRIC(mA)	P	P	P	P		P				P	P	P	W	W	W

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C1	C1	C1	C	C1	C	C1	C	C1			W	W	W
ACID NO. mgKOH/gm	.004	.004	.006	.001	0.004	0.001	0.003	.003	0.003		0.015	W	W	W
GUMS mg/100ml	2.6	6.2	17.6	2	3.2	4.4	4.8	9.6	3.8		7	W	W	O
HYDROPEROXIDES mM/l	.01	.01	.01	.004	0.01	0	0.01	0	0.01			W	W	W
CONDUCTIVITY pS/m @72°F	108	334	573	108	39	248	131	912	410	150	600	O	W	W
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
 Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
 W = Within Allowable Requirement; O = Outside Allowable Requirement
 OT = Material Tested Beyond Temperature Range
 N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
 UDRI TECH: J. DUES
 UDRI ENG: B. WILT
 UDRI P.I. ENG: D.H. KALT
 A.F. AUT. W./MLSE: A. FLETCHER
 A.F. AUT. WL/POSF: S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.K.7</u>	MATERIAL / IDENTITY:	<u>CARBON BEARING, CR PLATE, AMS 5613</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, PUMP, COATINGS</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>5 DEC '96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS						
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION			
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4	
	POST	POST	POST												
TENSILE (PSI)															
ELONGATION (%)															
VOLUME SWELL (%)															
HARD’S; a) SHORE A (PTS)															
b) PENCIL															
COMP. SET (avg. 2 spec’s)															
LAP SHEAR (PSI)															
COHESION (%)															
TAPE ADHESION (P/F)															
PEEL STRENGTH (LB/IN)															
LAMINAR SHEAR (PSI)															
RESISTIVITY (OHM-CM)															
TORQUE (INCH -LBS.)															
RUPTURE PRESS. (IN.HG)															
WET DIELECTRIC(mA)	P	P	P	P		P				P	P	P	W	W	W

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C1	C1	C1	C	C1	C	C1	C	C1			W	W	W
ACID NO. mgKOH/gm	NE	NE	NE	.001	.004	.001	.003	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	2	3.2	4.4	4.8	9.6	3.8		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.01	0	0.01	0	0.01			NE	NE	NE
CONDUCTIVITY pS/m @72°F	103	352	775	108	39	248	131	912	410	150	600	O	W	O
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
 Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
 W = Within Allowable Requirement; O = Outside Allowable Requirement
 OT = Material Tested Beyond Temperature Range
 N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

DATE: 24 MAR 98
 UDRI TECH: J. DUES
 UDRI ENG: B. WILT
 UDRI P.L. ENG: D.H. KALT
 A.F. AUT. W./MLSE: A. FLETCHER
 A.F. AUT. WL/POSF: S.A. ANDERSON

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists

Between Material Degradation and Fuel Properties Degradation

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.K.8.2</u>	MATERIAL / IDENTITY:	<u>PUMP, Carbon</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>AIRFRAME, COATINGS, BEARINGS</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>2 JUL '96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS						
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION			
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4	
	POST	POST	POST												
TENSILE (PSI)															
ELONGATION (%)															
VOLUME SWELL (%)															
HARD'S; a) SHORE A (PTS)															
b) PENCIL															
COMP. SET (avg. 2 spcm's)															
LAP SHEAR (PSI)															
COHESION (%)															
TAPE ADHESION (P/F)															
PEEL STRENGTH (LB/IN)															
LAMINAR SHEAR (PSI)															
RESISTIVITY (OHM-CM)															
TORQUE (INCH -LBS.)															
RUPTURE PRESS. (IN.HG)															
WET DIELECTRIC(mA)	P	P	P	P		P				P	P	P	W	W	W

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C2	C2	C2	C	C2	C	C2	C	C2			W	W	W
ACID NO. mgKOH/gm	.004	.006	.010	.001	.007	.001	.006	.003	.008		0.015	W	W	W
GUMS mg/100ml	3.2	5.8	12.0	2	3	4.4	3.4	9.6	12.2		7	W	W	O
HYDROPEROXIDES mM/l	ND	ND	ND	.004	.017	0	.015	0	.008			W	W	W
CONDUCTIVITY pS/m @72°F	NE	NE	NE	108	123	248	141	912	555	150	600	NE	NE	NE
VISUAL OBSERVATIONS	(.1328)gms	(.1014)gms	(.1087)gms									W	W	W

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF: S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.K.8.3</u>	MATERIAL / IDENTITY:	<u>PUMP CARBON</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>AIRFRAME, BEARINGS, P5N2</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>2 JUL '96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS						
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION			
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4	
	POST	POST	POST												
TENSILE (PSI)															
ELONGATION (%)															
VOLUME SWELL (%)															
HARD'S; a) SHORE A (PTS)															
b) PENCIL															
COMP. SET (avg. 2 spcm's)															
LAP SHEAR (PSI)															
COHESION (%)															
TAPE ADHESION (P/F)															
PEEL STRENGTH (LB/IN)															
LAMINAR SHEAR (PSI)															
RESISTIVITY (OHM-CM)															
TORQUE (INCH -LBS.)															
RUPTURE PRESS. (IN.HG)															
WET DIELECTRIC(mA)	P	P	P	P		P				P	P	P	W	W	W

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C2	C	C2	C	C2			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.007	.001	.006	.003	.008		0.015	NE	NE	NE
GUMS mg/100ml	1.6	7.4	14.4	2	3	4.4	3.4	9.6	12.2		7	W	O	O
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.017	0	.015	0	.008			NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	108	123	248	141	912	555	150	600	NE	NE	NE
VISUAL OBSERVATIONS	(.0953)	(.2294)	(.2010)									W	W	W

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
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OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF: S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.K.12</u>	MATERIAL / IDENTITY:	<u>FUEL / QTY PROBE MATERIAL</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>FUEL QT, PROBE, 40%GLASS FILED POLYPHENYLENE SULFIDE</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /92 POSF 2926</u>
TEST DATE START:	<u>3 JUL 97</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)	100	100	100	100	0				P	P	P	W	W	W
b) PENCIL	100	100	100	100	0				P	P	P	W	W	W
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
WET DIELECTRIC(mA)	P	P	P	P	P				P	P	P	W	W	W

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)														
ACID NO. mgKOH/gm											0.015			
GUMS mg/100ml											7			
HYDROPEROXIDES mM/l														
CONDUCTIVITY pS/m @72°F										150	600			
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF: S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>IL1</u>	MATERIAL / IDENTITY:	<u>THREADLOCK, GRADE A OR AV</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, LOCKING DEVICES</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>4 SEP '95</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS						
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION			
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4	
	POST	POST	POST												
TENSILE (PSI)															
ELONGATION (%)															
VOLUME SWELL (%)															
HARD'S; a) SHORE A (PTS)															
b) PENCIL															
COMP. SET (avg. 2 spcm's)															
LAP SHEAR (PSI)															
COHESION (%)															
TAPE ADHESION (P/F)															
PEEL STRENGTH (LB/IN)															
LAMINAR SHEAR (PSI)															
RESISTIVITY (OHM-CM)															
TORQUE (INCH -LBS.)	15	23	20	15		N/A		N/A		P	P	P	W	W	W
RUPTURE PRESS. (IN.HG)															
WET DIELECTRIC(mA)															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.001	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	.6	.8	4.4	2.8	9.6	8.6		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.001	.002	0	.032	0	.018			NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	100	66	248	131	912	410	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
 Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
 W = Within Allowable Requirement; O = Outside Allowable Requirement
 OT = Material Tested Beyond Temperature Range
 N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
 UDRI TECH: J. DUES
 UDRI ENG: B. WILT
 UDRI P.L. ENG: D.H. KALT
 A.F. AUT. W./MLSE: A. FLETCHER
 A.F. AUT. WL/POSF: S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>IL2</u>	MATERIAL / IDENTITY:	<u>THREADLOCK, (RED) MIL-S-22473</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL SYSTEM LOCKING DEVICES</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>4 SEP '95</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)	32	52	48	34		N/A		N/A	P	P	P	W	W	W
RUPTURE PRESS. (IN.HG)														
WET DIELECTRIC(mA)														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.001	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	.6	.8	4.4	2.8	9.6	8.6		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.001	.002	0	.032	0	.018			NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	100	66	248	131	912	410	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF: S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>IL.3</u>	MATERIAL / IDENTITY:	<u>THREADLOCK, (BROWN)</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL SYSTEM, LOCKING DEVICES</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>4 SEP '95</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)	15	23	23	13		N/A		N/A	P	P	P	W	W	W
RUPTURE PRESS. (IN.HG)														
WET DIELECTRIC(mA)														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.001	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	.6	.8	4.4	2.8	9.6	8.6		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.001	.002	0	.032	0	.018			NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	100	66	248	131	912	410	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
 Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
 W = Within Allowable Requirement; O = Outside Allowable Requirement
 OT = Material Tested Beyond Temperature Range
 N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
 UDRI TECH: J. DUES
 UDRI ENG: B. WILT
 UDRI P.L. ENG: D.H. KALT
 A.F. AUT. W./MLSE: A. FLETCHER
 A.F. AUT. WL/POSF: S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	IL.4 IM19/IIM10	MATERIAL / IDENTITY:	LOCKWIRE, SEE (I.M.19/I.L.M.10)
TEST TEMPERATURE (°F)	200	USE:	AIRFRAME/ENGINE FUEL SYSTEMS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	See IM19/IIM10	JP-8 BASELINE FUEL:	92 POSF 2926 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
WET DIELECTRIC(mA)														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)														
ACID NO. mgKOH/gm											0.015			
GUMS mg/100ml											7			
HYDROPEROXIDES mM/l														
CONDUCTIVITY pS/m @72°F										150	600			
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	I.M .1	MATERIAL / IDENTITY:	5052-0 ALUMINUM (BARE)
TEST TEMPERATURE (°F)	200	USE:	AIRFRAME / FUEL SYSTEM / LINES
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	8 SEP 94	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4						
	COLOR	L	L	L	L	L	L	CN	W	W					
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	CN	W	W						
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	CN	W	W						
AVG. WT. (gms)	5.1627	5.1625	5.1694	5.1692	5.1336	5.1334	Conductivity (%IACS) and Hardness Measurements Within Specification								
GAIN / LOSS (gms)		-.0002		-.0002		-.0002	CN	W	W						
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL						SPEC. RANGE FOR JP-8	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)							GENERAL OBSERVATIONS		
	JP-8		JP-8 + 100		JP-8 + 100 x4		MIN / MAX	JP8	+100	X4						
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST	W	W	W	
COLOR (7 DAYS)	C1	C1	C1	C1	C1	C1	C	C1	C	C1	C	C1				
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	94	158	220	148	738	391	108	123	248	141	912	555	150/600	W	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	24 APR 98
UDRI TECH:	A. BEHME
UTC ENG:	J. LEONE
UDRI P.I. ENG:	D.H. KALT
A.F. AUT. W./MLSA:	L. PERKINS
A.F. AUT. WL/POSF	S. A. ANDERSON

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	I.M.1	MATERIAL / IDENTITY:	5052-0 ALUMINUM (BARE)
TEST TEMPERATURE (°F)	325	USE:	AIRFRAME / FUEL SYSTEM / LINES
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	3 MAR 95	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	LI	L	LI	L	LI					CN	W	W	
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND					CN	W	W		
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	Minimum Pitting - All Samples					CN	W	W	
AVG. WT. (gms)	5.1554	5.1565	5.1485	5.1498	5.1733	5.1734									
GAIN / LOSS (gms)		+.0011		+.0013		+.0001	Conductivity (%IACS) and Hardness Measurements Within Specification					CN	W	W	
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL						SPEC. RANGE FOR JP-8	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)							GENERAL OBSERVATIONS		
	JP-8		JP-8 + 100		JP-8 + 100 x4		JP8	+100	X4							
	7	28	7	28	7	28				PRE	POST	PRE		POST	PRE	POST
COLOR (7 DAYS)	C3	C3	C3	C3	C2	C3	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	149	9	259	31	564	239	50	4	300	57	569	241	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color: L = *Light (No Deposit)* L1 - L2 = *Discoloration/Deposits*
 Fuel Color: C = *Clear* C1 - C6 = *Light to Dark*
 Designations: NE = *Not Evaluated;* ND = *Not Detected;* BD = *Below Detection* P = *Pitting*
 Comparisons: W = *Within Allowable Requirement;* O = *Outside Allowable Requirement*
 OT = *Material Tested Beyond Temperature Range* CN = *Control*
 N/A = *Not applicable;* LT = *Less than 500 ppb*
 GT = *Greater than 500 ppb*
 NSR = *No Spec. Req. and/or 4 (x) Additive Concentration*

DATE: 24 APR 98
 UDRI TECH: A. BEHME
 UTC ENG: J. LEONE
 UDRI P.I. ENG: D.H. KALT
 A.F. AUT. W./MLSA: L. PERKINS
 A.F. AUT. WL/POSF: S. A. ANDERSON

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M .2</u>	MATERIAL / IDENTITY:	<u>6061-T4 ALUMINUM (BARE)</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME / FUEL SYSTEM / LINES</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>1 DEC 94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS					
	RESULTS						OBSERVATIONS AND REFERENCES	OVERALL EVALUATION				
	JP-8		JP-8 +100		JP8+100 (X4)			JP8	+100	X4		
	PRE	POST	PRE	POST	PRE	POST						
COLOR	L	L1	L	L1	L	L1	Localized Discoloration on JP-8 Sample	CN	W	W		
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND		CN	W	W		
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	Minimum Pitting (Depth Negligible) - All Samples	CN	W	W		
AVG. WT. (gms)	5.6598	5.6598	5.6559	5.6561	5.6581	5.6583						
GAIN / LOSS (gms)		.0000		+.0002		+.0002	Conductivity (%IACS) and Hardness Measurements Within Specification	CN	W	W		
MICROSCOPY EVAL.												

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL		
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
	COLOR (7 DAYS)	C1	C2	C1	C1	C1	C1	C	C1	C	C1	C		C1	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	28	33	231	143	689	408	47	64	304	194	569	440	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color: L = *Light (No Deposit)* L1 - L2 = *Discoloration/Deposits*
 Fuel Color: C = *Clear* C1 - C6 = *Light to Dark*
 Designations: NE = *Not Evaluated;* ND = *Not Detected;* BD = *Below Detection* P = *Pitting*
 Comparisons: W = *Within Allowable Requirement;* O = *Outside Allowable Requirement*
 OT = *Material Tested Beyond Temperature Range* CN = *Control*
 N/A = *Not applicable;* LT = *Less than 500 ppb*
 GT = *Greater than 500 ppb*
 NSR = *No Spec. Req. and/or 4 (x) Additive Concentration*

DATE: 24 APR 98
 UDRI TECH: A. BEHME
 UTC ENG: J. LEONE
 UDRI P.I. ENG: D.H. KALT
 A.F. AUT. W./MLSA: L. PERKINS
 A.F. AUT. WL/POSF: S. A. ANDERSON

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M .2</u>	MATERIAL / IDENTITY:	<u>6061-T4 ALUMINUM (BARE)</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>AIRFRAME / FUEL SYSTEM / LINES</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>5 JAN 96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS									
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION			
	JP-8		JP-8 +100		JP8+100 (X4)											
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4	
	COLOR	L	LI	L	LI	L	LI	OT	OT	OT						
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	OT	OT	OT							
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	OT	OT	OT							
AVG. WT. (gms)	5.6691	5.6699	5.6661	5.6661	5.6749	5.6708										
GAIN / LOSS (gms)		+.0008		.0000		-.0041	Conductivity (%IACS) and Hardness Measurements Not in Spec - Samples Tested			OT	OT	OT				
MICROSCOPY EVAL.							Above Maximum Time / Temp Reheat for 6061-T4									
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL		
							OBSERVATIONS									
							JP-8		JP-8 + 100		JP-8 + 100 x4			JP8	+100	X4
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST	MIN / MAX	JP8	+100	X4
	COLOR (7 DAYS)	C2	C3	C3	C3	C2	C3	C	C2	C	C2	C	C2		W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	109	11	409	121	668	310	108	123	248	141	912	555	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Al	30	9	90	20	60	152	NE		NE		NE			NE	NE	NE
Mg	10	14	ND	20	10	52	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	<u>24 APR 98</u>
UDRI TECH:	<u>A. BEHME</u>
UTC ENG:	<u>J. LEONE</u>
UDRI P.I. ENG:	<u>D.H. KALT</u>
A.F. AUT. W./MLSA:	<u>L. PERKINS</u>
A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M .3</u>	MATERIAL / IDENTITY:	<u>6061-T6 ALUMINUM (BARE)</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME / FUEL SYSTEM / LINES</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>8 SEP 94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	L	L	L	L	L	CN	W	W					
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	CN	W	W						
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	CN	W	W						
AVG. WT. (gms)	1.6931	1.6925	1.7329	1.7077	1.7408	1.7404	Pitting (Negligible Depth) Most Evident on JP-8 Samples - Min. Pitting on All Others								
GAIN / LOSS (gms)		-.0006		-.0252		-.0004	Conductivity (%IACS) and Hardness Measurements Within Spec.								
MICROSCOPY EVAL.							CN	W	W						

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)							GENERAL		
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
COLOR (7 DAYS)	C1	C1	C1	C1	C1	C1	C	C1	C	C1	C	C1	W	W	W	
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	98	140	228	141	744	398	108	39	248	131	912	410	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	<u>24 APR 98</u>
UDRI TECH:	<u>A. BEHME</u>
UTC ENG:	<u>J. LEONE</u>
UDRI P.I. ENG:	<u>D.H. KALT</u>
A.F. AUT. W./MLSA:	<u>L. PERKINS</u>
A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M .3</u>	MATERIAL / IDENTITY:	<u>6061-T6 ALUMINUM (BARE)</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>AIRFRAME / FUEL SYSTEM / LINES</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>5 JAN 96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4						
	COLOR	L	LI	L	LI	L	LI	CN	W	W					
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	CN	W	W						
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	CN	W	W						
AVG. WT. (gms)	5.2574	5.2670	5.2658	5.2655	5.2331	5.2328									
GAIN / LOSS (gms)		+.0096		-.0003		-.0003	Conductivity (%IACS) and Hardness Measurements Within Spec.			CN	W	W			
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL		
							OBSERVATIONS									
	JP-8		JP-8 + 100		JP-8 + 100 x4		JP8	+100	X4							
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST	MIN / MAX	JP8	+100	X4
COLOR (7 DAYS)	C2	C3	C2	C3	C2	C3	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	101	6	409	46	661	355	108	123	248	141	912	555	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Al	7	13	12	45	38	160	NE		NE		NE			NE	NE	NE
Mg	90	12	120	38	145	65	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M .4</u>	MATERIAL / IDENTITY:	<u>7075-T6 ALUMINUM, CHROMIC ACID ANODIZED</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME / FUEL SYSTEM / LINES</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>8 SEP 94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4						
	COLOR	L	L	L	L	L	L	CN	W	W					
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	CN	W	W						
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	CN	W	W						
AVG. WT. (gms)	2.8542	2.8541	2.7900	2.7899	2.8468	2.8466									
GAIN / LOSS (gms)		-.0001		-.0001		-.0002	Conductivity (%IACS) and Hardness Measurements Within Spec.			CN	W	W			
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL		
							OBSERVATIONS									
	JP-8		JP-8 + 100		JP-8 + 100 x4		JP8	+100	X4							
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		MIN / MAX	JP8	+100
COLOR (7 DAYS)	C1	C1	C1	C1	C1	C1	C	C1	C	C1	C	C1		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	96	148	217	139	684	440	108	39	248	131	912	410	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M .4</u>	MATERIAL / IDENTITY:	<u>7075-T6 ALUMINUM, CHROMIC ACID ANODIZED</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>AIRFRAME / FUEL SYSTEM / LINES</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>4 OCT 95</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4						
	COLOR	L	L1	L	L1	L	L1	Discoloration- JP-8 Samples Only						OT	OT
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							OT	OT	OT
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	Minimum Pitting All Samples						OT	OT	OT
AVG. WT. (gms)	3.6023	3.6029	3.5825	3.5828	3.5980	3.5979									
GAIN / LOSS (gms)		+.0006		+.0003		-.0001							OT	OT	OT
MICROSCOPY EVAL.							Samples Not In T6 Condition Prior to Testing								

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL		
							OBSERVATIONS									
	JP-8		JP-8 + 100		JP-8 + 100 x4		JP8	+100	X4							
	PRE	POST	PRE	POST	PRE	POST										
COLOR (7 DAYS)	C1	C3	C2	C3	C3	C3	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	128	33	350	146	594	422	108	123	248	141	912	555	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Zn	30	28	40	33	44	41	NE		NE		NE			NE	NE	NE
Mg	8	12	30	32	18	6	NE		NE		NE			NE	NE	NE
Cu	18	13	20	21	20	16	NE		NE		NE			NE	NE	NE
Cr	1	2	2	1	1	3	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M .5</u>	MATERIAL / IDENTITY:	<u>7075-T6 ALUMINUM, ALODINE, 1200/IRIDITE/4</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME , FUEL SYSTEM</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>8 SEP 94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS										
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION				
	JP-8		JP-8 +100		JP8+100 (X4)												
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4		
	COLOR	L	LI	L	LI	L	LI					CN	W	W			
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND					CN	W	W				
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	Minimum Pitting (Depth Negligible) - All Samples				CN	W	W				
AVG. WT. (gms)	2.6961	2.6958	2.6915	2.6917	2.7193	2.7192											
GAIN / LOSS (gms)		-.0003		+.0002		-.0001	Conductivity (%IACS) and Hardness Measurements Within Specification				CN	W	W				
MICROSCOPY EVAL.																	
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL			
							OBSERVATIONS										
							7	28	7	28	7	28		PRE	POST	PRE	POST
	COLOR (7 DAYS)	C1	C1	C1	C1	C1	C1	C	C1	C	C1	C	C1		W	W	W
	CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	95	152	216	144	674	436	108	39	248	131	912	410	150/600	W	W	W	
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY											
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	<u>24 APR 98</u>
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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M .5</u>	MATERIAL / IDENTITY:	<u>7075-T6 ALUMINUM, ALODINE, 1200/IRIDITE/4</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>AIRFRAME , FUEL SYSTEM</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>4 OCT 95</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4						
	COLOR	L	L	L	L	L	L	CN	OT	OT					
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	CN	OT	OT						
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	OT	OT	OT						
AVG. WT. (gms)	3.5828	3.5837	3,5845	3.5852	3.5692	3.5692									
GAIN / LOSS (gms)		+.0009		+.0007		.0000	Conductivity (%IACS) and Hardness not in Spec			CN	OT	OT			
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL OBSERVATIONS		
							JP-8		JP-8 + 100		JP-8 + 100 x4			JP8	+100	X4
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST				
	COLOR (7 DAYS)	C2	C2	C3	C3	C3	C3	C	C2	C	C2	C		C2	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	129	3	354	38	587	254	108	123	248	141	912	555	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Pb	1	2	7	3	8	4	NE		NE		NE			NE	NE	NE
Zn	ND	NE	41	NE	39	NE	NE		NE		NE			NE	NE	NE
Mg	4	NE	60	NE	19	NE	NE		NE		NE			NE	NE	NE
Cr	1	2	1	1	8	86	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M .6</u>	MATERIAL / IDENTITY:	<u>7075-T6 ALUMINUM (BARE)</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME , FUEL SYSTEM</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>8 SEP 94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4						
	COLOR	L	L	L	L	L	L	CN	W	W					
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	CN	W	W						
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	CN	W	W						
AVG. WT. (gms)	2.7953	2.7952	2.8076	2.8074	2.7924	2.7920	Minimum Localized Pitting (Depth Negligible) - All Samples								
GAIN / LOSS (gms)		-.0001		-.0002		-.0004	Conductivity (%IACS) and Hardness Within Specification								
MICROSCOPY EVAL.							CN	W	W						

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							JP-8		JP-8 + 100		JP-8 + 100 x4			GENERAL		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		OBSERVATIONS		
	JP8	+100	X4													
COLOR (7 DAYS)	C1	C1	C1	C1	C1	C1	C	C1	C	C1	C	C1	W	W	W	
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	103	145	223	149	668	427	108	39	248	131	912	410	150/600	W	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	<u>24 APR 98</u>
UDRI TECH:	<u>A. BEHME</u>
UTC ENG:	<u>J. LEONE</u>
UDRI P.I. ENG:	<u>D.H. KALT</u>
A.F. AUT. W./MLSA:	<u>L. PERKINS</u>
A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M.6</u>	MATERIAL / IDENTITY:	<u>7075-T6 ALUMINUM (BARE)</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>AIRFRAME, FUEL SYSTEM</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 Normal and x4 Concentrations) / 93 POSF 2980</u>
TEST DATE START:	<u>4 OCT 95</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS										
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION				
	JP-8		JP-8 +100		JP8+100 (X4)												
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4		
	COLOR	L	L1	L	L	L	L	Light Surface Deposits JP-8 Only						CN	OT	OT	
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	OT	OT		
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	Minimum Pitting all Samples						CN	OT	OT		
AVG. WT. (gms)	NE	NE	NE	NE	NE	NE											
GAIN / LOSS (gms)		NE		NE		NE	Conductivity (%IACS) and Hardness not in Spec						CN	OT	OT		
MICROSCOPY EVAL.																	
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 70°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL			
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS			
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4	
	COLOR (7 DAYS)	NE	NE	NE	NE	NE	NE	C	C2	C	C2	C	C2		W	W	W
	CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	NE	NE	NE	NE	NE	NE	108	123	248	141	912	555	150/600	O	W	W	
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY											
Al	33	20	120	110	190	180	NE		NE		NE			NE	NE	NE	
Zn	10	28	40	18	35	15	NE		NE		NE			NE	NE	NE	
Mg	18	20	23	90	50	16	NE		NE		NE			NE	NE	NE	
Cu	10	19	90	21	18	16	NE		NE		NE			NE	NE	NE	

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	<u>24 APR 98</u>
UDRI TECH:	<u>A. BEHME</u>
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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M .7</u>	MATERIAL / IDENTITY:	<u>2024-T3 ALUMINUM (BARE)</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME , FUEL SYSTEM</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>8 SEP 94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4						
	COLOR	L	L	L	L	L	L	Localized Discoloration On JP-8 Sample						CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	Minimum Pitting (Depth Negligible) - All Samples						CN	W	W
AVG. WT. (gms)	2.9438	2.9435	2.8987	2.8985	2.9030	2.9029									
GAIN / LOSS (gms)		-.0003		-.0002		-.0001	Conductivity (%IACS) and Hardness Measurements Within Specification						CN	W	W
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL		
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
	COLOR (7 DAYS)	C1	C1	C1	C1	C1	C1	C	C1	C	C1	C	C1		W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	79	53	221	147	724	382	108	39	248	131	912	410	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	<u>24 APR 98</u>
UDRI TECH:	<u>A. BEHME</u>
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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M .7</u>	MATERIAL / IDENTITY:	<u>2024-T3 ALUMINUM (BARE)</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>AIRFRAME , FUEL SYSTEM</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>5 JUN 96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS							
	RESULTS						OBSERVATIONS AND REFERENCES					OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)									
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4					
COLOR	L	LI	L	LI	L	LI					CN	W	W	
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND					CN	W	W	
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	Minimum Pitting - All Samples				CN	W	W	
AVG. WT. (gms)	5.6366	5.6373	5.6494	5.6496	5.5251	5.5250								
GAIN / LOSS (gms)		+.0007		+.0002		-.0001	Conductivity (%IACS) and Hardness Measurements Within Specification				CN	W	W	
MICROSCOPY EVAL.														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							JP-8		JP-8 + 100		JP-8 + 100 x4			GENERAL		
														OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
COLOR (7 DAYS)	C1	C1	C1	C1	C1	C1	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	79	53	221	147	724	382	108	123	248	141	912	555	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Al	24	18	13	85	40	117	NE		NE		NE			NE	NE	NE
Mg	40	21	90	51	150	50	NE		NE		NE			NE	NE	NE
Cu	4	8	9	11	6	12	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color: L = *Light (No Deposit)* L1 - L2 = *Discoloration/Deposits*
 Fuel Color: C = *Clear* C1 - C6 = *Light to Dark*
 Designations: NE = *Not Evaluated;* ND = *Not Detected;* BD = *Below Detection* P = *Pitting*
 Comparisons: W = *Within Allowable Requirement;* O = *Outside Allowable Requirement*
 OT = *Material Tested Beyond Temperature Range* CN = *Control*
 N/A = *Not applicable;* LT = *Less than 500 ppb*
 GT = *Greater than 500 ppb*
 NSR = *No Spec. Req. and/or 4 (x) Additive Concentration*

DATE: 24 APR 98
 UDRI TECH: A. BEHME
 UTC ENG: J. LEONE
 UDRI P.I. ENG: D.H. KALT
 A.F. AUT. W./MLSA: L. PERKINS
 A.F. AUT. WL/POSF: S. A. ANDERSON

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M.8</u>	MATERIAL / IDENTITY:	<u>ALUMINUM (BARE) 2219-T87</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL SYSTEM</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) / 93 POSF 2980</u>
TEST DATE START:	<u>5 DEC 96</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	LI	L	LI	L	LI	Localized Surface Deposits All Samples						CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	Pitting All Samples						CN	W	W
AVG. WT. (gms)	6.3335	6.3326	6.3354	6.3347	6.3406	6.3397									
GAIN / LOSS (gms)		-.0009		-.0007		-.0009	Conductivity (%IACS) and Hardness Within Spec						CN	W	W
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 70°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
														GENERAL		
														OBSERVATIONS		
	7	28	7	28	7	28	JP-8	JP-8 + 100	JP-8 + 100 x4	JP8	+100	X4				
	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	MIN / MAX			
COLOR (7 DAYS)	C1	C1	C1	C1	C1	C1	C	C1	C	C1	C	C1		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	229	106	573	303	845	870	100	66	656	114	1070	59	150/600	O	O	O
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	<u>24 APR 98</u>
UDRI TECH:	<u>A. BEHME</u>
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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M .8</u>	MATERIAL / IDENTITY:	<u>2219-T87 ALUMINUM (BARE)</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>AIRFRAME , TANK AND PLUMBING</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>3 MAR 95</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4						
	COLOR	L	L	L	L	L	L	CN	OT	OT					
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	CN	OT	OT						
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	Pitting - All Samples	CN	OT	OT					
AVG. WT. (gms)	5.8356	5.8369	5.8394	5.8501	5.7949	5.7951									
GAIN / LOSS (gms)		+0013		+0107		+0002	Conductivity (%IACS) and hardness not in Spec	CN	OT	OT					
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)							GENERAL		
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
COLOR (7 DAYS)	C2	C4	C4	C4	C3	C4	C	C2	C	C2	C	C2	O	O	O	
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	149	47	258	114	560	376	50	4	300	57	569	241	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Cu	ND	ND	ND	ND	ND	ND	NE		NE		NE			NE	NE	NE
Pb	<100	ND	<100	ND	<100	ND	NE		NE		NE			NE	NE	NE
Sn	ND	ND	ND	ND	ND	ND	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	<u>24 APR 98</u>
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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M .9</u>	MATERIAL / IDENTITY:	<u>3003 ALUMINUM (BARE)</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME , TANK AND PLUMBING</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>1 DEC 94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4						
	COLOR	L	LI	L	LI	L	LI	CN	W	W					
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	CN	W	W						
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	CN	W	W						
AVG. WT. (gms)	5.5418	5.5416	5.5324	5.5324	5.5175	5.5172									
GAIN / LOSS (gms)		-.0002		.0000		-.0003	Conductivity (%IACS) and Hardness Measurements Within Specifications			CN	W	W			
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							GENERAL									
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
COLOR (7 DAYS)	C1	C1	C1	C1	C1	C1	C	C1	C	C1	C	C1	W	W	W	
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	34	29	234	144	692	396	47	64	304	194	569	440	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
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	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	<u>24 APR 98</u>
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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M .9</u>	MATERIAL / IDENTITY:	<u>3003 ALUMINUM (BARE)</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>AIRFRAME , TANK AND PLUMBING</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>5 JAN 96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4						
	COLOR	L	LI	L	LI	L	LI	CN	W	W					
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	CN	W	W						
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	CN	W	W						
AVG. WT. (gms)	3.5168	3.5179	3.5278	3.5281	3.5110	3.5111									
GAIN / LOSS (gms)		+.0011		+.0003		+.0001	Conductivity (%IACS) and Hardness Measurements Within Specifications			CN	W	W			
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL		
							OBSERVATIONS									
	JP-8		JP-8 + 100		JP-8 + 100 x4		JP8	+100	X4							
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST	MIN / MAX	JP8	+100	X4
COLOR (7 DAYS)	C2	C2	C2	C3	C2	C3	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	101	25	390	133	671	438	108	123	248	141	912	555	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Al	5	14	12	64	15	154	NE		NE		NE			NE	NE	NE
Mn	ND	ND	ND	ND	ND	ND	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	<u>24 APR 98</u>
UDRI TECH:	<u>A. BEHME</u>
UTC ENG:	<u>J. LEONE</u>
UDRI P.I. ENG:	<u>D.H. KALT</u>
A.F. AUT. W./MLSA:	<u>L. PERKINS</u>
A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M .10 / ILM .19</u>	MATERIAL / IDENTITY:	<u>A 355 - T6 CAST ALUMINUM</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME , FUEL SYSTEM</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>15 DEC 94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4						
	COLOR	L	L1	L	L1	L	L1	Minimum Discoloration All Samples						CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND							CN	W	W
AVG. WT. (gms)	1.0375	1.0374	1.0715	1.0715	1.0583	1.0581									
GAIN / LOSS (gms)		-.0001		.0000		-.0002							CN	W	W
MICROSCOPY EVAL.							Conductivity (%IACS) and Hardness Within Specification								

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)							GENERAL OBSERVATIONS		
	JP-8		JP-8 + 100		JP-8 + 100 x4		JP8	+100	X4							
	7	28	7	28	7	28				PRE	POST	PRE		POST	PRE	POST
COLOR (7 DAYS)	C2	C2	C1	C2	C1	C2	C	C1	C	C1	C	C1		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	31	33	238	139	682	404	47	64	304	194	569	440	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M .11 / ILM .20</u>	MATERIAL / IDENTITY:	<u>A 356 - T6 CAST ALUMINUM</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME , FUEL SYSTEM</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>15 DEC 94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	L1	L	L1	L	L1	Discoloration All samples						CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND							CN	W	W
AVG. WT. (gms)	.9317	.9317	.9738	.9738	1.0182	1.0179									
GAIN / LOSS (gms)		.0000		.0000		-.0003							CN	W	W
MICROSCOPY EVAL.							Hardness and Conductivity Within Specification								

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL						SPEC. RANGE FOR JP-8	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)							GENERAL OBSERVATIONS		
							JP-8		JP-8 + 100		JP-8 + 100 x4					
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST	MIN / MAX	JP8	+100	X4
COLOR (7 DAYS)	C2	C2	C1	C2	C1	C1	C	C1	C	C1	C	C1		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	33	34	242	125	686	403	47	64	304	194	569	440	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
AI	NE	NE	NE	NE	NE	NE										

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M.12</u>	MATERIAL / IDENTITY:	<u>ALUMINUM BARS 7050-T7451</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME , FUEL SYSTEM</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) / 93 POSF 2980</u>
TEST DATE START:	<u>5 DEC 96</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS											
	RESULTS						OBSERVATIONS AND REFERENCES					OVERALL EVALUATION						
	JP-8		JP-8 +100		JP8+100 (X4)													
	PRE	POST	PRE	POST	PRE	POST						JP8	+100	X4				
COLOR	L	L1	L	L1	L	L1	Minimum Discoloration/Deposits All Samples					CN	W	W				
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND						CN	W	W				
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND						CN	W	W				
AVG. WT. (gms)	6.1950	6.1949	6.2860	6.2856	6.2352	6.2347												
GAIN / LOSS (gms)		-.0001		-.0004		-.0005						CN	W	W				
MICROSCOPY EVAL.																		

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 70°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL OBSERVATIONS			
							JP-8		JP-8 + 100		JP-8 + 100 x4						
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4	
COLOR (7 DAYS)	C1	C1	C1	C1	C1	C1	C	C1	C	C1	C	C1		W	W	W	
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST											
PS/M AT 72° F	223	105	577	290	851	795	108	66	656	114	1040	59	150/600	O	O	W	
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY											
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M .13 / ILM .13</u>	MATERIAL / IDENTITY:	<u>316, STAINLESS STEEL</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME , FUEL SYSTEM</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>8 SEP 94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS									
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION			
	JP-8		JP-8 +100		JP8+100 (X4)											
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4	
	COLOR	L	L	L	L	L	L	CN	W	W						
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	CN	W	W							
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND	CN	W	W							
AVG. WT. (gms)	14.7461	14.7462	14.6602	14.6597	14.7572	14.7567										
GAIN / LOSS (gms)		+.0001		-.0005		-.0005	CN	W	W							
MICROSCOPY EVAL.																
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
														GENERAL		
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
COLOR (7 DAYS)	C2	C2	C1	C2	C1	C1	C	C1	C	C1	C	C1	W	W	W	
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	33	34	242	125	686	403	108	39	248	131	912	410	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Cr	NE	NE	NE	20	NE	NE	NE		NE		NE			NE	NE	NE
Fe	NE	NE	NE	50	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	I.M .14 / ILM .14	MATERIAL / IDENTITY:	321, STAINLESS STEEL
TEST TEMPERATURE (°F)	200	USE:	AIRFRAME , ENGINE FUEL SYSTEM
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	8 SEP 94	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS							
	RESULTS						OBSERVATIONS AND REFERENCES					OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)							JP8	+100	X4
	PRE	POST	PRE	POST	PRE	POST								
	COLOR	L	LI	L	LI	L	LI		CN	W	W			
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	Corrosion Forming in Surface Crevices (Crevices Formed During Rolling Operation	CN	W	W				
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND	of Sheet Material) - All Samples	CN	W	W				
AVG. WT. (gms)	19.2690	19.2693	19.4725	19.4720	19.4609	19.4604								
GAIN / LOSS (gms)		+.0003		-.0005		-.0005		CN	W	W				
MICROSCOPY EVAL.														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL		
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
COLOR (7 DAYS)	C1	C1	C1	C1	C1	C1	C	C1	C	C1	C	C1		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	72	36	226	136	679	433	108	39	248	131	912	410	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Cr	NE	NE	NE	<5	NE	NE	NE		NE		NE			NE	NE	NE
Fe	NE	NE	NE	10	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color: L = Light (No Deposit) L1 - L2 = Discoloration/Deposits
 Fuel Color: C = Clear C1 - C6 = Light to Dark
 Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection P = Pitting
 Comparisons: W = Within Allowable Requirement; O = Outside Allowable Requirement
 OT = Material Tested Beyond Temperature Range CN = Control
 N/A = Not applicable; LT = Less than 500 ppb
 GT = Greater than 500 ppb
 NSR = No Spec. Req. and/or 4 (x) Additive Concentration

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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M .15 / ILM .12</u>	MATERIAL / IDENTITY:	<u>304, STAINLESS STEEL</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME , FUEL SYSTEM</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>8 SEP 94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	LI	L	LI	L	LI	CN	W	W					
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	CN	W	W						
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND	CN	W	W						
AVG. WT. (gms)	15.3242	15.3241	15.4429	15.4425	15.5630	15.5626	Corrosion Forming in Surface Crevices (Crevices Formed During Rolling Operation of Sheet Material) - All Samples								
GAIN / LOSS (gms)		-.0001		-.0004		-.0004	CN	W	W						
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL						SPEC. RANGE FOR JP-8	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)							GENERAL OBSERVATIONS		
	JP-8		JP-8 + 100		JP-8 + 100 x4		JP8	+100	X4							
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST	MIN / MAX			
COLOR (7 DAYS)	C1	C1	C1	C1	C1	C1	C	C1	C	C1	C	C1	W	W	W	
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	68	38	226	145	720	422	108	39	248	131	912	410	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Fe	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
Cr	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
Ni	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	<u>24 APR 98</u>
UDRI TECH:	<u>A. BEHME</u>
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UDRI P.I. ENG:	<u>D.H. KALT</u>
A.F. AUT. W./MLSA:	<u>L. PERKINS</u>
A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>LM .16 / IL.M .6</u>	MATERIAL / IDENTITY:	<u>INCO 718, NICKEL</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME , FUEL SYSTEM</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>1 DEC 94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	L	L	L	L	L	CN	W	W					
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	CN	W	W						
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND	CN	W	W						
AVG. WT. (gms)	16.1558	16.1559	16.0695	16.0693	16.3168	16.3166									
GAIN / LOSS (gms)		+.0001		-.0002		-.0002	CN	W	W						
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL		
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
	COLOR (7 DAYS)	C1	C1	C1	C1	C1	C1	C	C1	C	C1	C	C1	W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	32	26	228	167	681	389	47	64	304	194	569	440	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M .17 / ILM .11</u>	MATERIAL / IDENTITY:	<u>440C STAINLESS STEEL</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME , FUEL SYSTEM</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>2 MAR 95</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	L	L	L	L	L	Localized Discoloration - All Samples						CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND							CN	W	W
AVG. WT. (gms)	25.4133	25.4118	25.4144	25.4150	25.4802	25.4808									
GAIN / LOSS (gms)		-.0015		+.0006		+.0006							CN	W	W
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL						SPEC. RANGE FOR JP-8	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)							GENERAL OBSERVATIONS		
	JP-8		JP-8 + 100		JP-8 + 100 x4		JP8	+100	X4							
	7	28	7	28	7	28				PRE	POST	PRE	POST	PRE	POST	MIN / MAX
COLOR (7 DAYS)	C2	C2	C1	C1	C1	C1	C	C1	C	C1	C	C1		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	171	56	288	304	663	493	108	39	248	131	912	410	150/600	W	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Cr	<10	<10	<10	<10	<10	<10	NE		NE		NE			NE	NE	NE
Fe	20	60	35	35	15	80	NE		NE		NE			NE	NE	NE
Mo	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>LM .18 / ILM .8</u>	MATERIAL / IDENTITY:	<u>347 STAINLESS STEEL</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME , FUEL SYSTEM</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>8 SEP 94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS										
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION				
	JP-8		JP-8 +100		JP8+100 (X4)												
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4		
	COLOR	L	LI	L	LI	L	LI						CN	W	W		
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W		
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND							CN	W	W		
AVG. WT. (gms)	16.0541	16.0543	16.0578	16.0575	15.8608	15.8601											
GAIN / LOSS (gms)		+.0002		-.0003		-.0007							CN	W	W		
MICROSCOPY EVAL.																	
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL			
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS			
							PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4	
	COLOR (7 DAYS)	C1	C1	C1	C1	C1	C1	C	C1	C	C1	C	C1		W	W	W
	CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	79	35	228	132	694	430	108	39	248	131	912	410	150/600	O	O	W	
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY											
Cr	NE	NE	NE	<5	NE	NE	NE		NE		NE			NE	NE	NE	
Fe	NE	NE	NE	60	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M .19 / ILM .10</u>	MATERIAL / IDENTITY:	<u>ALLOY 30302, 5688H (AMS), FERROUS</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME , FUEL SYSTEM (LOCKWIRE)</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>2 MAR 95</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST	Discoloration All Samples	JP8	+100	X4					
	COLOR	L	L2	L	L2	L					L2				
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND									
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND									
AVG. WT. (gms)	2.1102	2.1102	2.0031	2.0029	2.1241	2.1240									
GAIN / LOSS (gms)		.0000		-.0002		-.0001									
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)							GENERAL OBSERVATIONS		
	JP-8		JP-8 + 100		JP-8 + 100 x4		MIN / MAX	JP8	+100	X4						
	7	28	7	28	7	28					PRE	POST	PRE	POST	PRE	POST
COLOR (7 DAYS)	C2	C2	C1	C1	C1	C1	C	C1	C	C1	C	C1		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	162	47	289	234	647	462	108	39	248	131	912	410	150/600	O	W	NSR
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Cr	<10	<10	<10	<10	<10	<10	NE		NE		NE			NE	NE	NE
Ni	<10	<10	<10	<10	<10	<10	NE		NE		NE			NE	NE	NE
Fe	125	35	55	70	60	85	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M .20 / ILM .24</u>	MATERIAL / IDENTITY:	<u>17-4 pH STAINLESS STEEL, AMS 5604/5643</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME , FUEL SYSTEM</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>1 DEC 94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	LI	L	LI	L	LI	Localized Discoloration - All Samples						CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND							CN	W	W
AVG. WT. (gms)	15.6057	15.6061	15.5955	15.5956	15.8229	15.8225									
GAIN / LOSS (gms)		.0004		.0001		-.0004							CN	W	W
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL						SPEC. RANGE FOR JP-8	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)							GENERAL OBSERVATIONS		
	JP-8		JP-8 + 100		JP-8 + 100 x4		JP8	+100	X4							
	7	28	7	28	7	28				PRE	POST	PRE		POST	PRE	POST
COLOR (7 DAYS)	C2	C2	C1	C1	C1	C1	C	C1	C	C1	C	C1		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	31	29	230	160	667	392	47	64	304	194	569	440	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Cr	ND	NE	10	NE	10	NE	NE		NE		NE			NE	NE	NE
Ni	10	NE	10	NE	10	NE	NE		NE		NE			NE	NE	NE
Cu	20	NE	30	NE	40	NE	NE		NE		NE			NE	NE	NE
Fe	10	NE	ND	NE	ND	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M.21</u>	MATERIAL / IDENTITY:	<u>1010 CADMIUM PLATE (CLASS 2), FERROUS</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>AIRFRAME , FUEL SYSTEM</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>13 DEC 95</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4						
COLOR	L	LI	L	LI	L	LI					CN	W	W		
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND					CN	W	W		
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	Pitting - All Samples				CN	W	W		
AVG. WT. (gms)	14.7372	14.7363	14.6692	14.6673	14.7155	14.7140									
GAIN / LOSS (gms)		-.0009		-.0019		-.0015						CN	W	W	
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)							GENERAL OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
COLOR (7 DAYS)	C2	C4	C2	C4	C2	C3	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	236	97	493	214	675	408	50	4	300	57	569	241	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Fe	2	11	14	17	33	30	NE		NE		NE			NE	NE	NE
Cd	ND	ND	ND	ND	ND	ND	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
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	GT =	Greater than 500 ppb		
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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M.22</u>	MATERIAL / IDENTITY:	<u>1010 ZINC PLATE, FERROUS</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>AIRFRAME , TANK, AND PLUMBING</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>8 FEB 96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	LI	L	LI	L	LI					CN	W	W	
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND					CN	W	W		
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	Pitting - All Samples					CN	W	W	
AVG. WT. (gms)	14.9737	14.9710	14.7334	14.7286	14.7765	14.7708									
GAIN / LOSS (gms)		-.0027		-.0048		-.0057						CN	W	W	
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL						SPEC. RANGE FOR JP-8	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)							GENERAL OBSERVATIONS		
	JP-8		JP-8 + 100		JP-8 + 100 x4		PRE	POST	PRE	POST	PRE	POST				
	7	28	7	28	7	28								PRE	POST	PRE
COLOR (7 DAYS)	C3	C3	C4	C4	C3	C2	C	C2	C	C2	C	C2		W	O	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	108	33	483	223	817	387	108	123	248	141	912	555	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Fe	35	ND	23	1	85	3	NE		NE		NE			NE	NE	NE
Zn	85	6	20	15	81	21	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	<u>24 APR 98</u>
UDRI TECH:	<u>A. BEHME</u>
UTC ENG:	<u>J. LEONE</u>
UDRI P.I. ENG:	<u>D.H. KALT</u>
A.F. AUT. W./MLSA:	<u>L. PERKINS</u>
A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M.23</u>	MATERIAL / IDENTITY:	<u>4130 CADMIUM PLATE (CLASS II), FERROUS, TYPE 2 GOAL</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME , FUEL SYSTEM</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>8 SEP 94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS										
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION				
	JP-8		JP-8 +100		JP8+100 (X4)												
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4		
	COLOR	L	L	L	L	L	L	Localized Discoloration All Samples						CN	W	W	
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W		
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND							CN	W	W		
AVG. WT. (gms)	10.4805	10.4832	10.3138	10.3139	10.3494	10.3492											
GAIN / LOSS (gms)		+.0027		+.0001		-.0002							CN	W	W		
MICROSCOPY EVAL.																	
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL			
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS			
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4	
	COLOR (7 DAYS)	C	C1	C	C1	C	C1	C	C1	C	C1	C	C1		W	W	W
	CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	77	33	224	136	705	437	108	39	248	131	912	410	150/600	O	O	W	
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY											
Fe	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
Cd	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	<u>24 APR 98</u>
UDRI TECH:	<u>A. BEHME</u>
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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	LM.23	MATERIAL / IDENTITY:	4130 CADMIUM PLATE (CLASS II), FERROUS, TYPE 2 GOLD
TEST TEMPERATURE (°F)	325	USE:	AIRFRAME , FUEL SYSTEM
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	26 SEP 96	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS										
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION				
	JP-8		JP-8 +100		JP8+100 (X4)												
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4								
	COLOR	L	L3	L	L2	L	L2	SEVERE DISCOLORATION - JP-8						CN	W	W	
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W		
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND	LOCALIZED UNIFORM CORROSION - ALL SAMPLES						CN	W	W		
AVG. WT. (gms)	15.8434	15.8436	15.8217	15.8180	15.7906	15.7839											
GAIN / LOSS (gms)		+.0002		-.0037		-.0067							CN	W	W		
MICROSCOPY EVAL.																	
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL			
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS			
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4	
	COLOR (7 DAYS)	C6	C5	C5	C4	C6	C4	C	C2	C	C2	C	C2		W	W	W
	CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	200	77	558	72	984	205	108	123	248	141	912	555	150/600	O	O	W	
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY											
Fe	ND	10	90	170	360	1010	NE		NE		NE			NE	NE	NE	
Cd	ND	ND	ND	ND	ND	10	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE: 24 APR 98
 UDRI TECH: A. BEHME
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 UDRI P.I. ENG: D.H. KALT
 A.F. AUT. W./MLSA: L. PERKINS
 A.F. AUT. WL/POSF: S. A. ANDERSON

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M.24 / ILM.1</u>	MATERIAL / IDENTITY:	<u>6 AL - 4 V, TITANIUM</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME , FUEL SYSTEM</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>8 SEP 94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS					
	RESULTS						OBSERVATIONS AND REFERENCES	OVERALL EVALUATION				
	JP-8		JP-8 +100		JP8+100 (X4)			JP8	+100	X4		
	PRE	POST	PRE	POST	PRE	POST						
COLOR	L	L1	L	L1	L	L1	Localized Discoloration - All Samples	CN	W	W		
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND		CN	W	W		
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND		CN	W	W		
AVG. WT. (gms)	6.0379	6.0380	6.0280	6.0276	6.1284	6.1283						
GAIN / LOSS (gms)		+.0001		-.0004		-.0001		CN	W	W		
MICROSCOPY EVAL.												

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL		
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
	COLOR (7 DAYS)	C	C1	C	C1	C	C1	C	C2	C	C2	C		C2		W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	72	40	223	173	684	433	108	37	248	131	912	410	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color: L = *Light (No Deposit)* L1 - L2 = *Discoloration/Deposits*
 Fuel Color: C = *Clear* C1 - C6 = *Light to Dark*
 Designations: NE = *Not Evaluated;* ND = *Not Detected;* BD = *Below Detection* P = *Pitting*
 Comparisons: W = *Within Allowable Requirement;*
 OT = *Material Tested Beyond Temperature Range* O = *Outside Allowable Requirement*
 N/A = *Not applicable;* CN = *Control*
 GT = *Greater than 500 ppb* LT = *Less than 500 ppb*
 NSR = *No Spec. Req. and/or 4 (x) Additive Concentration*

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

DATE: 24 APR 98
 UDRI TECH: A. BEHME
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 A.F. AUT. W./MLSA: L. PERKINS
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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M.25</u>	MATERIAL / IDENTITY:	<u>950 BRONZE ALUMINUM, CU</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME , FUEL SYSTEM</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>15 DEC 94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS										
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION				
	JP-8		JP-8 +100		JP8+100 (X4)												
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4		
	COLOR	L	L1	L	L1	L	L1					CN	W	W			
PITTING (VIS UAL)	ND	ND	ND	ND	ND	ND					CN	W	W				
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND					CN	W	W				
AVG. WT. (gms)	1.5671	1.5672	1.5073	1.5072	1.6203	1.6193											
GAIN / LOSS (gms)		+.0001		-.0001		-.0010						CN	W	W			
MICROSCOPY EVAL.																	
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL			
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS			
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4	
	COLOR (7 DAYS)	C2	C3	C1	C2	C1	C2	C	C1	C	C1	C	C1		O	W	W
	CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	32	38	241	129	671	424	108	39	248	131	912	410	150/600	O	O	W	
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY											
Cu	NE	0	NE	50	NE	10	NE		NE		NE			NE	NE	NE	
Al	NE	ND	NE	ND	NE	ND	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M.25</u>	MATERIAL / IDENTITY:	<u>950 BRONZE ALUMINUM, CU</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>AIRFRAME , FUEL SYSTEM</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>5 JAN 96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	L1	L	L1	L	L1	Discoloration and Deposits - All Samples						CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	Minimum Pitting - All Samples						CN	W	W
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P							CN	W	W
AVG. WT. (gms)	17.1217	17.1170	16.8903	16.8854	17.0882	17.0841									
GAIN / LOSS (gms)		-.0047		-.0049		-.0041							CN	W	W
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							JP-8		JP-8 + 100		JP-8 + 100 x4			GENERAL		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		OBSERVATIONS		
	JP8	+100	X4													
COLOR (7 DAYS)	C4	C5	C4	C6	C6	C5	C	C2	C	C2	C	C2		O	O	O
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	243	133	507	258	912	552	108	123	248	141	912	555	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	<u>24 APR 98</u>
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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M.26A</u>	MATERIAL / IDENTITY:	<u>NAVAL BRASS (Cu / Ni - 70 / 30)</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME , FUEL SYSTEM</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>22 AUG 96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS									
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION			
	JP-8		JP-8 +100		JP8+100 (X4)											
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4	
	COLOR	L	L2	L	L1	L	L1	Severe Discoloration and Deposits JP-8.						CN	W	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	Minimum Discoloration and Deposits - +100 & x4						CN	W	W	
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	Minimum Pitting - All Samples						CN	W	W	
AVG. WT. (gms)	30.1833	30.1805	29.2547	29.2529	30.0340	30.0325										
GAIN / LOSS (gms)		-.0028		-.0018		-.0015							CN	W	W	
MICROSCOPY EVAL.																
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL		
														OBSERVATIONS		
							JP-8		JP-8 + 100		JP-8 + 100 x4			JP8	+100	X4
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		MIN / MAX		
COLOR (7 DAYS)	C4	C5	C4	C6	C6	C5	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	198	112	486	334	868	552	108	39	248	131	912	410	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Cu	NE	30	NE	230	NE	110	NE		NE		NE			NE	NE	NE
Ni	NE	10	NE	150	NE	180	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	<u>24 APR 98</u>
UDRI TECH:	<u>A. BEHME</u>
UTC ENG:	<u>J. LEONE</u>
UDRI P.I. ENG:	<u>D.H. KALT</u>
A.F. AUT. W./MLSA:	<u>L. PERKINS</u>
A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>LM.26B</u>	MATERIAL / IDENTITY:	<u>NAVAL BRASS (Cu / Ni - 90 / 10)</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME , FUEL SYSTEM</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>22 AUG 96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	L2	L	L1	L	L1	Discoloration and Deposits - All Samples						CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	Minimum Pitting - All Samples						CN	W	W
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P							CN	W	W
AVG. WT. (gms)	18.5510	18.5478	18.6481	18.6458	18.5285	18.5267									
GAIN / LOSS (gms)		-.0032		-.0023		-.0018							CN	W	W
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)							GENERAL OBSERVATIONS		
	JP-8		JP-8 + 100		JP-8 + 100 x4		JP8	+100	X4							
	7	28	7	28	7	28				PRE	POST	PRE		POST	PRE	POST
COLOR (7 DAYS)	C3	C4	C3	C3	C3	C2	C	C1	C	C1	C	C1		O	O	O
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	213	103	495	326	865	604	108	39	248	131	912	410	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Cu	NE	400	NE	1160	NE	1880	NE		NE		NE			NE	NE	NE
Ni	NE	10	NE	90	NE	30	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M.27</u>	MATERIAL / IDENTITY:	<u>268 BRASS SHEET, SUBSTITUTE 260, Cu</u>
TEST TEMPERATURE (°F)	<u>160</u>	USE:	<u>AIRFRAME , FUEL SYSTEM</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>11 OCT 96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	L1	L	L	L	L	Discoloration - JP-8 Sample Only						CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	CN							W	W
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND	CN							W	W
AVG. WT. (gms)	16.9376	16.9372	17.1012	17.1000	17.0336	17.0324									
GAIN / LOSS (gms)		-.0004		-.0012		-.0012							CN	W	W
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 160°F)							TEST RESULTS GENERAL OBSERVATIONS		
	JP-8		JP-8 + 100		JP-8 + 100 x4		JP8	+100	X4							
	7	28	7	28	7	28				PRE	POST	PRE		POST	PRE	POST
COLOR (7 DAYS)	C2	C2	C1	C1	C1	C1	C	C1	C	C1	C	C1		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	212	130	573	423	1094	752	NE	NE	NE	NE	NE	NE	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Cu	70	60	590	780	940	620	NE		NE		NE			NE	NE	NE
Zn	ND	70	170	320	410	270	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	<u>24 APR 98</u>
UDRI TECH:	<u>A. BEHME</u>
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A.F. AUT. W./MLSA:	<u>L. PERKINS</u>
A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M.27</u>	MATERIAL / IDENTITY:	<u>268 BRASS SHEET, SUBSTITUTE 260, Cu</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME , FUEL SYSTEM</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>15 OCT 96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	L2	L	L2	L	L2	Discoloration - JP-8 Sample Only						CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	CN							W	W
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND	CN							W	W
AVG. WT. (gms)	17.0971	17.0918	17.0691	17.0653	17.1710	17.1656									
GAIN / LOSS (gms)		-.0053		-.0038		-.0054						CN	W	W	
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							JP-8		JP-8 + 100		JP-8 + 100 x4			GENERAL		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		OBSERVATIONS		
	JP8	+100	X4													
COLOR (7 DAYS)	C2	C3	C2	C3	C2	C2	C	C1	C	C1	C	C1		O	O	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	199	96	497	364	888	820	108	39	248	131	912	410	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Cu	800	2670	920	3700	3520	3750	NE		NE		NE			NE	NE	NE
Zn	80	950	420	1640	2010	700	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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A.F. AUT. W./MLSA:	<u>L. PERKINS</u>
A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M.27</u>	MATERIAL / IDENTITY:	<u>268 BRASS SHEET, SUBSTITUTE 260, Cu</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>AIRFRAME , FUEL SYSTEM</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>17 OCT 96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4						
	COLOR	L	L4	L	L3	L	L3	Severe Discoloration and Deposits - All Samples						CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND							CN	W	W
AVG. WT. (gms)	17.1217	17.1170	16.8903	16.8854	17.0882	17.0841									
GAIN / LOSS (gms)		-.0047		-.0049		-.0041							CN	W	W
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL		
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
	COLOR (7 DAYS)	C4	C5	C4	C6	C6	C5	C	C2	C	C2	C	C2		O	O
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	243	133	507	258	912	552	108	123	248	141	912	555	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Cu	320	NE	1160	NE	490	NE	NE		NE		NE			NE	NE	NE
Zn	820	NE	2240	NE	2500	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	<u>24 APR 98</u>
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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M.28</u>	MATERIAL / IDENTITY:	<u>LEAD AMS 4751 / 4750</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME ,TANK, AND PLUMBING</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>5 DEC 96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS										
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION				
	JP-8		JP-8 +100		JP8+100 (X4)												
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4								
	COLOR	L	LI	L	LI	L	LI	DEPOSITS ALL SAMPLES						CN	W	W	
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W		
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	LOCALIZED PITTING ALL SAMPLES						CN	W	W		
AVG. WT. (gms)	24.5921	24.5873	25.3667	25.3607	24.8926	24.8796											
GAIN / LOSS (gms)		-.0048		-.0060		-.0130							CN	W	W		
MICROSCOPY EVAL.																	
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8	TEST RESULTS			
							JP-8		JP-8 + 100		JP-8 + 100 x4			GENERAL OBSERVATIONS			
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST	MIN / MAX	JP8	+100	X4	
	COLOR (7 DAYS)	C2	C2	C2	C1	C2	C1	C	C1	C	C1	C	C1		W	W	W
	CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	299	88	439	294	686	768	108	39	248	131	912	410	150/600	O	W	W	
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY											
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	<u>24 APR 98</u>
UDRI TECH:	<u>A. BEHME</u>
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A.F. AUT. W./MLSA:	<u>L. PERKINS</u>
A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	LM.28	MATERIAL / IDENTITY:	LEAD, AMS 4751 / 4750
TEST TEMPERATURE (°F)	325	USE:	AIRFRAME ,TANK, AND PLUMBING
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	4 OCT 95	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	L1	L	L1	L	L1					CN	W	W	
PITTING (VISUAL)	ND	P	ND	P	ND	P					CN	W	W		
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	Pitting - All Samples					CN	W	W	
AVG. WT. (gms)	24.4441	24.4370	23.9283	23.9120	24.6278	24.6055									
GAIN / LOSS (gms)		-.0071		-.0163		-.0223						CN	W	W	
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL OBSERVATIONS		
							JP-8		JP-8 + 100		JP-8 + 100 x4			JP8	+100	X4
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST				
COLOR (7 DAYS)	C2		C2		C2		C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	97	5	358	62	597	641	108	123	248	141	912	555	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Pb	600	1200	50,000	7000	22,000	26,200	NE		NE		NE			NE	NE	NE
Sn	5	6	5	5	6	5	NE		NE		NE			NE	NE	NE
Cu	7	9	25	33	34	60	NE		NE		NE			NE	NE	NE
Be	ND	ND	ND	ND	ND	ND	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE: 24 APR 98
 UDRI TECH: A. BEHME
 UTC ENG: J. LEONE
 UDRI P.I. ENG: D.H. KALT
 A.F. AUT. W./MLSA: L. PERKINS
 A.F. AUT. WL/POSF: S. A. ANDERSON

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M.29</u>	MATERIAL / IDENTITY:	<u>BARIUM FERRITE, Ba</u>
TEST TEMPERATURE (°F)	<u>160</u>	USE:	<u>AIRFRAME ,TANK / EXT. (QT. LEVEL)</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>11 OCT 96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS												
	RESULTS						OBSERVATIONS AND REFERENCES					OVERALL EVALUATION							
	JP-8		JP-8 +100		JP8+100 (X4)							JP8	+100	X4					
	PRE	POST	PRE	POST	PRE	POST													
COLOR	L	L	L	L	L	L						CN	W	W					
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND						CN	W	W					
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND	Control -.46 KG					CN	W	W					
AVG. WT. (gms)	2.2464	2.2485	2.2610	2.2598	2.2722	2.2657	JP-8- .45 KG												
GAIN / LOSS (gms)		+.0021		-.0012		-.0065	+100- .45 KG					CN	W	W					
MICROSCOPY EVAL.							X4- .47 KG												

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 160°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL OBSERVATIONS			
							JP-8		JP-8 + 100		JP-8 + 100 x4			JP8	+100	X4	
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST					
COLOR (7 DAYS)	C1	C1	C1	C1	C1	C1	C	C1	C	C1	C	C1		W	W	W	
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST											
PS/M AT 72° F	231	186	564	489	1078	789	NE	NE	NE	NE	NE	NE	150/600	W	W	W	
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY											
Fe	10	NE	10	NE	60	NE	NE		NE		NE			NE	NE	NE	
Ba	30	NE	ND	NE	ND	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	<u>24 APR 98</u>
UDRI TECH:	<u>A. BEHME</u>
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A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M.29</u>	MATERIAL / IDENTITY:	<u>BARIUM FERRITE, Ba</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME ,TANK / EXT. (QT. LEVEL)</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>22 AUG 96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	NE	L	NE	L	NE	Material Deterioration Significant						OT	OT
PITTING (VISUAL)	ND	NE	ND	NE	ND	NE							OT	OT	OT
PITTING (MICROSCOPY)	ND	NE	ND	NE	ND	NE	Control - .46KG						OT	OT	OT
AVG. WT. (gms)	2.2474	2.2095	2.2486	2.2203	2.2415	2.2227	JP-8 - .32 KG								
		-. 0379		-.0283		-.0188	+100 - .35KG						OT	OT	OT
MICROSCOPY EVAL.							X4 - .32KG								

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
														GENERAL		
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
COLOR (7 DAYS)	C2	C2	C2	C2	C2	C2	C	C1	C	C1	C	C1		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	226	105	494	337	862	531	108	123	248	141	912	555	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Fe	NE	80	NE	ND	NE	120	NE		NE		NE			NE	NE	NE
Ba	NE	10	NE	ND	NE	ND	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M.29</u>	MATERIAL / IDENTITY:	<u>BARIUM FERRITE</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>AIRFRAME ,TANK / EXT. (QT. LEVEL)</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>2 JUL 96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS									
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION			
	JP-8		JP-8 +100		JP8+100 (X4)											
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4							
	COLOR	L	NE	L	NE	L	NE	Material Deteteriation Significant						OT	OT	OT
PITTING (VISUAL)	ND	NE	ND	NE	ND	NE	Control: .46 KG						OT	OT	OT	
PITTING (MICROSCOPY)	ND	NE	ND	NE	ND	NE	JP-8: .15 KG						OT	OT	OT	
AVG. WT. (gms)	NE	NE	NE	NE	NE	NE	+100: .20 KG									
GAIN / LOSS (gms)		NE		NE		NE	x4: .22 KG						OT	OT	OT	
MICROSCOPY EVAL.																
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL		
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
	COLOR (7 DAYS)	NE	NE	NE	NE	NE	NE	C	C2	C	C2	C		C2		W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	NE	NE	NE	NE	NE	NE	108	123	248	141	912	555	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Ba	10	16	ND	33	640	100	NE		NE		NE			NE	NE	NE
Fe	65	200	12	650	2000	1300	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

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Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>LM.30</u>	MATERIAL / IDENTITY:	<u>NEO-DYMIUM,</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME FUEL TANK / EXT. (LEVEL CONTROL)</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>22 AUG 96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	L2	L	L2	L	L2	Deposits/Discoloration All Samples						CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND	Control - .85 KG						CN	W	W
AVG. WT. (gms)	2.0941	2.0918	2.1128	2.1042	1.8184	1.8117	JP-8 - .72 KG								
GAIN / LOSS (gms)		-.0023		-.0086		-.0067	+100 - .78 KG						CN	W	W
MICROSCOPY EVAL.							X4 - .75 KG								

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL OBSERVATIONS		
							JP-8		JP-8 + 100		JP-8 + 100 x4			JP8	+100	X4
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST				
	COLOR (7 DAYS)	C2	C2	C2	C2	C2	C2	C	C1	C	C1	C	C1		W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	215	101	490	345	928	657	108	39	248	131	912	410	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Fe	NE	70	NE	10	NE	20	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	LM.30	MATERIAL / IDENTITY:	NEO-DYMIUM,
TEST TEMPERATURE (°F)	325	USE:	AIRFRAME FUEL TANK / EXT. (LEVEL CONTROL)
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	2 JUL 96	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS										
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION				
	JP-8		JP-8 +100		JP8+100 (X4)												
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4		
	COLOR	L	L2	L	L2	L	L2	Deposits/Discoloration All Samples						CN	W	W	
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W		
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND	Control - .85 KG						CN	W	W		
AVG. WT. (gms)	NE	NE	NE	NE	NE	NE	JP-8 - .32										
GAIN / LOSS (gms)		NE		NE		NE	+100 - .32						CN	W	W		
MICROSCOPY EVAL.							X4 - .35										
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8	TEST RESULTS GENERAL			
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS			
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST	MIN / MAX	JP8	+100	X4	
	COLOR (7 DAYS)	NE	NE	NE	NE	NE	NE	C	C2	C	C2	C	C2		W	W	W
	CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	NE	NE	NE	NE	NE	NE	108	123	248	141	912	555	150/600	O	W	W	
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY											
Fe	NE	ND	410	140	840	345	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	LM.31	MATERIAL / IDENTITY:	B36 - 91A, BRASS SHEET, Cu
TEST TEMPERATURE (°F)	200	USE:	AIRFRAME, TANK PUMP SCREEN
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	1 DEC 94	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	LI	L	LI	L	LI	Localized Discoloration						CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND							CN	W	W
AVG. WT. (gms)	17.5591	17.5587	17.5658	17.5653	17.5371	17.5353									
GAIN / LOSS (gms)		-.0004		-.0005		-.0018							CN	W	W
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							JP-8		JP-8 + 100		JP-8 + 100 x4			GENERAL OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
COLOR (7 DAYS)	C2	C3	C3	C1	C4	C2	C	C1	C	C1	C	C1		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	29	48	231	185	675	631	108	39	248	131	912	410	150/600	O	W	O
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Cu	800	15	1350	90	2900	300	NE		NE		NE			NE	NE	NE
Pb	30	ND	40	ND	40	ND	NE		NE		NE			NE	NE	NE
Sn	100	ND	100	ND	100	ND	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

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Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	LM.31	MATERIAL / IDENTITY:	B36 - 91A, BRASS SHEET, Cu
TEST TEMPERATURE (°F)	325	USE:	AIRFRAME, TANK PUMP SCREEN
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	3 MAR 95	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS										
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION				
	JP-8		JP-8 +100		JP8+100 (X4)												
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4								
	COLOR	L	L3	L	L3	L	L3	Localized Discoloration All Samples						CN	W	W	
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W		
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	Minimum Pitting All Samples - Depth Not Measurable						CN	W	W		
AVG. WT. (gms)	17.5518	17.5524	17.5304	17.5294	17.5245	17.5230											
GAIN / LOSS (gms)		+.0006		-.0010		-.0015							CN	W	W		
MICROSCOPY EVAL.																	
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL			
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS			
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4		
	COLOR (7 DAYS)	C2	C2	C2	C2	C2	C2	C2	C	C2	C	C2	C	C2	W	W	W
	CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	136	5	264	94	567	385	108	123	248	141	912	555	150/600	O	O	W	
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY											
Cu	180	320	590	370	860	<10	NE		NE		NE			NE	NE	NE	
Pb	100	10	130	10	100	ND	NE		NE		NE			NE	NE	NE	
Sn	100	NE	160	NE	180	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	

NOTES:

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A.F. AUT. W./MLSA:	L. PERKINS
A.F. AUT. WL/POSF	S. A. ANDERSON

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M.32</u>	MATERIAL / IDENTITY:	<u>1010 (BARE), Fe</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL SYSTEM</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>1 DEC 94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS									
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION			
	JP-8		JP-8 +100		JP8+100 (X4)											
	PRE	POST	PRE	POST	PRE	POST										
	COLOR	L	L3	L	L2	L	L1	Uniform Corrosion Over 50% of Surface Area, One Side Only - All Samples						JP8	+100	X4
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W	
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	Minimum Pitting - All Samples						CN	W	W	
AVG. WT. (gms)	14.4516	14.4515	14.5668	14.5662	14.6412	14.6409										
GAIN / LOSS (gms)		-.0001		-.0006		-.0003							CN	W	W	
MICROSCOPY EVAL.																
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL		
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
	COLOR (7 DAYS)	C1	C2	C1	C1	C1	C1	C	C1	C	C1	C	C1		W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	33	29	232	167	673	403	108	39	248	131	912	410	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	<u>24 APR 98</u>
UDRI TECH:	<u>A. BEHME</u>
UTC ENG:	<u>J. LEONE</u>
UDRI P.I. ENG:	<u>D.H. KALT</u>
A.F. AUT. W./MLSA:	<u>L. PERKINS</u>
A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	LM32	MATERIAL / IDENTITY:	1010 (BARE), Fe
TEST TEMPERATURE (°F)	325	USE:	AIRFRAME, FUEL SYSTEM
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	26 SEP 96	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4						
	COLOR	L	L3	L	L3	L	L3	Uniform Corrosion All Samples						CN	W
PITTING (VISUAL)	ND	P	ND	P	ND	P	Surface Corrosion on All Samples - Removed With 120 Grit Sandpaper						CN	W	W
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	Pitting All Samples						CN	W	W
AVG. WT. (gms)	16.8207	16.7769	16.8280	16.8234	16.7777	16.8155									
GAIN / LOSS (gms)		-.0438		-.0046		+0.378							CN	W	W
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)							GENERAL OBSERVATIONS		
	JP-8		JP-8 + 100		JP-8 + 100 x4		JP8	+100	X4							
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		MIN / MAX	JP8	+100
COLOR (7 DAYS)	C6	C5	C6	C3	C6	C4	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	207	85	558	98	986	216	108	123	248	141	912	555	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Fe	ND	40	120	780	370	1680	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE: 24 APR 98
UDRI TECH: A.
UTC ENG: J.
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W./MLSA: L. PERKINS
A.F. AUT. WL/POSF S. A. ANDERSON

BEHME _____
LEONE _____

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M.33</u>	MATERIAL / IDENTITY:	<u>B - 29 (ASTM), SOFT LEAD, Pb</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL SYSTEM</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /92 POSF 2926</u>
TEST DATE START:	<u>13 FEB 97</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	LI	L	LI	L	LI	Minimum Surface Deposits All Samples						CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	CN							W	W
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND	CN							W	W
AVG. WT. (gms)	6.8966	6.8958	6.9306	6.9294	7.1736	7.1706									
GAIN / LOSS (gms)		-.0009		-.0012		-.0030						CN	W	W	
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							JP-8		JP-8 + 100		JP-8 + 100 x4			GENERAL		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
COLOR (7 DAYS)	C1	C1	C1	C1	C1	C1	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	28	25	221	170	606	449	108	39	248	131	912	410	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Pb	850	NE	1280	NE	2470	NE	NE		NE		NE			NE	NE	NE
Cu	10	NE	10	NE	10	NE	NE		NE		NE			NE	NE	NE
Sn	ND	NE	ND	NE	ND	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	<u>24 APR 98</u>
UDRI TECH:	<u>A. BEHME</u>
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A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	IM34/IIM27	MATERIAL / IDENTITY:	MONEL 400
TEST TEMPERATURE (°F)	325	USE:	AIRFRAME, TANK,& PLUMBING
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	6 DEC 95	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS									
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION			
	JP-8		JP-8 +100		JP8+100 (X4)											
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4							
	COLOR	L	LI	L	LI	L	LI	Surface Deposits All Samples						CN	W	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W	
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND							CN	W	W	
AVG. WT. (gms)	15.8205	15.8175	15.7782	15.7762	15.6879	15.6849										
GAIN / LOSS (gms)		-.0030		-.0020		-.0030							CN	W	W	
MICROSCOPY EVAL.																
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL		
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
	COLOR (7 DAYS)	C4	C5	C4	C5	C4	C5	C	C2	C	C2	C	C2		NE	NE
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	235	162	500	210	757	482	50	4	300	57	569	241	150/600	W	W	NE
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	160	360	270	610	830	840	NE		NE		NE			NE	NE	NE
	790	1310	850	1070	1060	1900	NE		NE		NE			NE	NE	NE
							NE		NE		NE			NE	NE	NE
							NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	24 MAR 98
UDRI TECH:	A. BEHME
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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M.35</u>	MATERIAL / IDENTITY:	<u>15-5 pH, STAINLESS STEEL</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>AIRFRAME, FUEL SYSTEM</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>26 SEP 96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS									
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION			
	JP-8		JP-8 +100		JP8+100 (X4)											
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4	
	COLOR	L	L2	L	L1	L	L1	Severe Discoloration -JP-8						CN	W	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	45 Minute Power Outage During Test Cycle						CN	W	W	
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND	Uniform Corrosion In Crevices From Rough Surface Finish - All Samples						CN	W	W	
AVG. WT. (gms)	16.6912	16.6924	16.5808	16.5806	16.4901	16.4899										
GAIN / LOSS (gms)		+.0012		-.0002		-.0002							CN	W	W	
MICROSCOPY EVAL.																
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL		
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS		
							PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		MIN / MAX		
COLOR (7 DAYS)	C6	C6	C6	C6	C6	C6	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	198	69	558	81	975	111	108	123	248	141	912	555	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Cr	10	20	80	210	290	150	NE		NE		NE			NE	NE	NE
Ni	ND	30	ND	20	ND	10	NE		NE		NE			NE	NE	NE
Cu	ND	30	ND	70	ND	30	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	<u>24 APR 98</u>
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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.M.36</u>	MATERIAL / IDENTITY:	<u>5052 -H34 ALUMINUM</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL SYSTEM</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>15 OCT 96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS										
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION				
	JP-8		JP-8 +100		JP8+100 (X4)												
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4								
	COLOR	L	LI	L	LI	L	LI	Discoloration - All Samples						CN	W	W	
PITTING (VISUAL)	ND	P	ND	P	ND	P							CN	W	W		
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	Localized Pitting - All Samples						CN	W	W		
AVG. WT. (gms)	5.2936	5.2932	5.3672	5.3668	5.3308	5.3303											
GAIN / LOSS (gms)		-.0004		-.0004		-.0005							CN	W	W		
MICROSCOPY EVAL.																	
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL			
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS			
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4	
	COLOR (7 DAYS)	C2	C2	C1	C1	C1	C1	C	C1	C	C1	C	C1		W	W	W
	CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	182	112	519	295	890	467	108	39	248	131	912	410	150/600	O	W	W	
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY											
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	<u>24 APR 98</u>
UDRI TECH:	<u>A. BEHME</u>
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A.F. AUT. W./MLSA:	<u>L. PERKINS</u>
A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	LM.37/IM23	MATERIAL / IDENTITY:	4130 CADMIUM PLATE, CLASS II, TYPE 2 GOLD, FE
TEST TEMPERATURE (°F)	325	USE:	AIRFRAME , FUEL SYSTEM
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /92 POSF 2926
TEST DATE START:	2 DEC 97	JP-8 BASELINE FUEL:	92 POSF 2926+ (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS							
	RESULTS						OBSERVATIONS AND REFERENCES					OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)							JP8	+100	X4
	PRE	POST	PRE	POST	PRE	POST								
	COLOR	L	I2	L	I2	L	I2	Localized Discoloration All Samples					CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND						CN	W	W
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND						CN	W	W
AVG. WT. (gms)	18.4768	18.4777	19.0468	19.0446	18.8277	18.8269								
GAIN / LOSS (gms)		+.0009		-.0022		-.0008						CN	W	W
MICROSCOPY EVAL.														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL OBSERVATIONS		
							JP-8		JP-8 + 100		JP-8 + 100 x4			JP8	+100	X4
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST				
COLOR (7 DAYS)	C6	C5	C4	C6	C5	C6	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	252	138	409	108	703	148	108	123	248	141	912	555	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color: L = *Light (No Deposit)* L1 - L2 = *Discoloration/Deposits*
 Fuel Color: C = *Clear* C1 - C6 = *Light to Dark*
 Designations: NE = *Not Evaluated;* ND = *Not Detected;* BD = *Below Detection* P = *Pitting*
 Comparisons: W = *Within Allowable Requirement;* O = *Outside Allowable Requirement*
 OT = *Material Tested Beyond Temperature Range* CN = *Control*
 N/A = *Not applicable;* LT = *Less than 500 ppb*
 GT = *Greater than 500 ppb*
 NSR = *No Spec. Req. and/or 4 (x) Additive Concentration*

DATE: 24 APR 98
 UDRI TECH: A. BEHME
 UTC ENG: J. LEONE
 UDRI P.I. ENG: D.H. KALT
 A.F. AUT. W./MLSA: L. PERKINS
 A.F. AUT. WL/POSF: S. A. ANDERSON

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>LM.38</u>	MATERIAL / IDENTITY:	<u>1045 BARE, FERROUS</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>AIRFRAME, FUEL SYSTEM</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>5 DEC 96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS							
	RESULTS						OBSERVATIONS AND REFERENCES					OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)							JP8	+100	X4
	PRE	POST	PRE	POST	PRE	POST								
	COLOR	L	L3	L	L2	L	L2	Uniform Corrosion All Samples					CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND						CN	W	W
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND						CN	W	W
AVG. WT. (gms)	17.7013	17.6974	17.8509	17.8474	17.6757	17.6721								
GAIN / LOSS (gms)		-.0039		-.0035		-.0036						CN	W	W
MICROSCOPY EVAL.							Rough Surface Finish All Samples							

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8	TEST RESULTS GENERAL		
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		MIN / MAX	JP8	+100
COLOR (7 DAYS)	C2	C2	C2	C2	C2	C2	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	236	6	574	30	895	541	108	123	248	141	912	555	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Fe	80	150	NE	580	NE	830	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>LM39</u>	MATERIAL / IDENTITY:	<u>AZ91 T-6 (SUBSTITUTE AZ31 - H24), MAGNESIUM</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL SYSTEM</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>5 DEC 96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS						
	RESULTS						OBSERVATIONS AND REFERENCES				OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)								
	PRE	POST	PRE	POST	PRE	POST					JP8	+100	X4
	COLOR	L	LI	L	LI	L	LI	Localized Uniform Corrosion	CN	W	W		
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND		CN	W	W			
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	Minimum Pitting All Samples	CN	W	W			
AVG. WT. (gms)	3.8919	3.8920	3.8841	3.8858	3.8900	3.8950							
GAIN / LOSS (gms)		+0.001		+0.017		+0.0050		CN	W	W			
MICROSCOPY EVAL.													

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8	TEST RESULTS		
							JP-8		JP-8 + 100		JP-8 + 100 x4			GENERAL		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		MIN / MAX	JP8	+100
COLOR (7 DAYS)	C1	C1	C1	C1	C1	C1	C	C1	C	C1	C	C1		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	222	111	598	311	891	875	108	39	248	131	912	410	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Al	NE	60	NE	40	NE	30	NE		NE		NE			NE	NE	NE
Mg	NE	90	NE	80	NE	70	NE		NE		NE			NE	NE	NE
Zn	NE	ND	NE	10	NE	ND	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	LM.40	MATERIAL / IDENTITY:	4130 BARE, STEEL, Fe
TEST TEMPERATURE (°F)	325	USE:	AIRFRAME, FUEL SYSTEM
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /92 POSF 2926
TEST DATE START:	13 FEB 97	JP-8 BASELINE FUEL:	92 POSF 2926 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4						
	COLOR	L	L3	L	L2	L	L2	UNIFORM CORROSION ALL SAMPLES						CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND							CN	W	W
AVG. WT. (gms)	18.6185	18.6166	18.5955	18.5854	18.6291	18.6134	*AFTER 7 DAYS SIGNIFICANT AMOUNT OF DEBRIS WAS NOTED (AS SOLID)								
GAIN / LOSS (gms)		-.0079		-.0101		-.0157	IN FUEL						CN	W	W
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							JP-8		JP-8 + 100		JP-8 + 100 x4			GENERAL OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
COLOR (7 DAYS)	C3	C3	C3	C3	C4	C4	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	239	55	404	87	657	467	108	123	248	141	912	555	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	24 APR 98
UDRI TECH:	A. BEHME
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A.F. AUT. WL/POSF	S. A. ANDERSON

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>LM.41</u>	See I.J.16	MATERIAL / IDENTITY:	<u>SOLDER Sn 95-Sb 05 WIRE .020"</u>
TEST TEMPERATURE (°F)	<u>200</u>		USE:	<u>ENGINE FUEL CONTROL STEPPER MOTOR</u>
EXPOSURE TIME (DAYS)	<u>28</u>		TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>NTP</u>		JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)								JP8	+100	X4
	PRE	POST	PRE	POST	PRE	POST									
	COLOR														
PITTING (VISUAL)															
PITTING (MICROSCOPY)															
AVG. WT. (gms)															
GAIN / LOSS (gms)															
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL OBSERVATIONS		
							JP-8		JP-8 + 100		JP-8 + 100 x4			JP8	+100	X4
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST				
	COLOR (7 DAYS)															
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F													150/600			
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	<u>24 MAR 98</u>
UDRI TECH:	<u>A. BEHME</u>
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A.F. AUT. W./MLSA:	<u>L. PERKINS</u>
A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	IM42	MATERIAL / IDENTITY:	2014-T6 ALUMINUM, AMS 4029
TEST TEMPERATURE (°F)	200	USE:	AIRFRAME, FUEL SYSTEM
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /92 POSF 2926
TEST DATE START:	2 DEC 97	JP-8 BASELINE FUEL:	92 POSF 2926 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4						
COLOR	L	L	L	L	L	L						CN	W	W	
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND						CN	W	W	
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND						CN	W	W	
AVG. WT. (gms)	3.5644	3.5648	3.5375	3.5374	3.5485	3.5485									
GAIN / LOSS (gms)		+.0004		-.0001		.0000	Conductivity (%IACS) and Hardness Within Specification					CN	W	W	
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL OBSERVATIONS		
	7 28 7 28 7 28						JP-8		JP-8 + 100		JP-8 + 100 x4			JP8	+100	X4
							PRE	POST	PRE	POST	PRE	POST				
	COLOR (7 DAYS)	C2	C2	C1	C1	C1	C1	C	C1	C	C1	C	C1		W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	231	151	420	366	622	530	108	39	248	131	912	410	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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A.F. AUT. WL/POSF	S. A. ANDERSON

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	IM43	MATERIAL / IDENTITY:	4340 STEEL 280ksi, AMS 6415
TEST TEMPERATURE (°F)	325	USE:	AIRFRAME, FUEL SYSTEM
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /92 POSF 2926
TEST DATE START:	16 SEP 97	JP-8 BASELINE FUEL:	92 POSF 2926 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS									
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION			
	JP-8		JP-8 +100		JP8+100 (X4)											
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4	
	COLOR	L	L2	L	L2	L	L2	Uniform Corrosion All Samples						CN	W	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W	
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND							CN	W	W	
AVG. WT. (gms)	25.3202	35.3203	25.4938	25.4944	25.5582	25.5582										
GAIN / LOSS (gms)		+.0001		+.0006		.0000							CN	W	W	
MICROSCOPY EVAL.																
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL		
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST	MIN / MAX	JP8	+100	X4
	COLOR (7 DAYS)	C2	C5	C2	C6	C2	C6	C	C2	C	C2	C	C2			
	CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST									
PS/M AT 72° F	254	152	424	154	654	286	108	123	248	141	912	555	150/600			
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	24 APR 98
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A.F. AUT. W./MLSA:	L. PERKINS
A.F. AUT. WL/POSF	S. A. ANDERSON

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	ILM.1 / ILM.24	MATERIAL / IDENTITY:	6AL - 4V, TITANIUM
TEST TEMPERATURE (°F)	325	USE:	ENGINE FUEL LINES & COMPONENTS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	28 DEC 94	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS						
	RESULTS						OBSERVATIONS AND REFERENCES				OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)						JP8	+100	X4
	PRE	POST	PRE	POST	PRE	POST							
	COLOR	L	L3	L	L2	L	L2	Discoloration / Surface Deposits - All Samples				CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND					CN	W	W
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND					CN	W	W
AVG. WT. (gms)	9.2673	9.2677	9.3776	9.3781	9.3262	9.3264							
GAIN / LOSS (gms)		+0.0004		+0.0005		+0.0002					CN	W	W
MICROSCOPY EVAL.													

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL		
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
COLOR (7 DAYS)	C2	C3	C2	C3	C2	C3	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	31	14	230	28	669	146	50	4	300	57	569	241	150/600	O	O	O
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

DATE: 24 APR 98
UDRI TECH: A. BEHME
UTC ENG: J. LEONE
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W./MLSA: L. PERKINS
A.F. AUT. WL/POSF: S. A. ANDERSON

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>ILM.2</u>	MATERIAL / IDENTITY:	<u>3AL - 2.5V, TITANIUM (TUBING)</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>ENGINE FUEL LINES & COMPONENTS</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>15 OCT 96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS										
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION				
	JP-8		JP-8 +100		JP8+100 (X4)												
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4		
	COLOR	L	L1	L	L	L	L						CN	W	W		
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND						CN	W	W			
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND						CN	W	W			
AVG. WT. (gms)	4.4033	4.4031	4.4804	4.4803	4.4781	4.4780											
GAIN / LOSS (gms)		-.0002		-.0001		-.0001						CN	W	W			
MICROSCOPY EVAL.																	
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL OBSERVATIONS			
							JP-8		JP-8 + 100		JP-8 + 100 x4			JP8	+100	X4	
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST					
	COLOR (7 DAYS)	C2	C2	C1	C1	C1	C1	C	C1	C	C1	C	C1		W	W	W
	CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	181	109	504	273	897	473	108	39	248	131	912	410	150/600	O	W	W	
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY											
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	<u>24 APR 98</u>
UDRI TECH:	<u>A. BEHME</u>
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A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	ILM.2	MATERIAL / IDENTITY:	3 AI-2.5V ,TITANIUM (TUBING)
TEST TEMPERATURE (°F)	325	USE:	ENGINE, FUEL LINES COMPONENTS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	5 DEC 96	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS						
	RESULTS						OBSERVATIONS AND REFERENCES				OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)						JP8	+100	X4
	PRE	POST	PRE	POST	PRE	POST							
	COLOR	L	L1	L	L1	L	L1	Discoloration All Samples	CN	W	W		
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND		CN	W	W			
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND		CN	W	W			
AVG. WT. (gms)	NE	NE	NE	NE	NE	NE							
GAIN / LOSS (gms)		NE		NE		NE		NE	NE	NE			
MICROSCOPY EVAL.													

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL		
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
	COLOR (7 DAYS)	NE	NE	NE	NE	NE	NE	C	C1	C	C1	C		C1	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	NE	NE	NE	NE	NE	NE	108	123	248	141	912	555	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

DATE:	24 APR 98
UDRI TECH:	A. BEHME
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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>ILM.2</u>	MATERIAL / IDENTITY:	<u>3AL - 2.5V, TITANIUM (TUBING)</u>
TEST TEMPERATURE (°F)	<u>400</u>	USE:	<u>ENGINE FUEL LINES & COMPONENTS</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>22 AUG 96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS									
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION			
	JP-8		JP-8 +100		JP8+100 (X4)											
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4							
	COLOR	L	LI	L	LI	L	LI	Discoloration All Samples						CN	W	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W	
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND							CN	W	W	
AVG. WT. (gms)	4.1603	4.1604	4.4244	4.4244	4.5080	4.5079										
GAIN / LOSS (gms)		+.0001		.0000		-.0001							CN	W	W	
MICROSCOPY EVAL.																
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 400°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL		
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
	COLOR (7 DAYS)	C3	C3	C3	C3	C3	C3	C	C3	C	C3	C	C3		W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	226	10	483	69	861	415	108	5	248	5	912	428	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>ILM.3</u>	MATERIAL / IDENTITY:	<u>HASTELLOY, NICKEL</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>ENGINE FUEL LINES & COMPONENTS</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>20 OCT 94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS									
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION			
	JP-8		JP-8 +100		JP8+100 (X4)											
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4	
	COLOR	L	LI	L	LI	L	LI	CN	W	W						
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	CN	W	W							
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND	CN	W	W							
AVG. WT. (gms)	17.2923	17.2923	17.0890	17.0890	16.9086	16.9082										
GAIN / LOSS (gms)		.0000		.0000		-.0004	CN	W	W							
MICROSCOPY EVAL.																
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL		
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS		
							PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
	COLOR (7 DAYS)	C	C	C	C	C	C	C3	C	C3	C	C3		W	W	W
	CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST									
PS/M AT 72° F	59	31	218	200	644	413	108	39	248	131	912	410	150/600	O	W	NSR
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Ni																
Mo																
Cr																
Fe																

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>ILM.3</u>	MATERIAL / IDENTITY:	<u>HASTELLOY, NICKEL</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>ENGINE FUEL LINES & COMPONENTS</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>23 NOV 94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	LI	L	LI	L	LI	Surface Discoloration - All Samples						CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	CN							W	W
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND	CN							W	W
AVG. WT. (gms)	17.6842	17.6844	17.3760	17.3764	17.1287	17.1282									
GAIN / LOSS (gms)		.0002		.0004		-.0005							CN	W	W
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)							GENERAL OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
COLOR (7 DAYS)	C2	C2	C2	C2	C2	C2	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	33	12	232	25	665	219	50	4	300	57	569	241	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	ILM.4	MATERIAL / IDENTITY:	WASPALOY, NICKEL
TEST TEMPERATURE (°F)	200	USE:	ENGINE FUEL LINES & COMPONENTS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	20 OCT 94	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	LI	L	LI	L	LI						CN	W	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND						CN	W	W	
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND						CN	W	W	
AVG. WT. (gms)	15.3851	15.3851	15.2743	15.2740	15.4495	15.4495									
GAIN / LOSS (gms)		.0000		-.0003		.0000						CN	W	W	
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							JP-8		JP-8 + 100		JP-8 + 100 x4			GENERAL		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		OBSERVATIONS		
	JP8	+100	X4													
COLOR (7 DAYS)	C1	C1	C1	C1	C1	C1	C	C1	C	C1	C	C1		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	62	27	223	134	645	423	108	39	248	131	912	410	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	ILM.4	MATERIAL / IDENTITY:	WASPALOY, NICKEL
TEST TEMPERATURE (°F)	325	USE:	ENGINE FUEL LINES & COMPONENTS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	23 NOV 94	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS										
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION				
	JP-8		JP-8 +100		JP8+100 (X4)												
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4								
	COLOR	L	L2	L	L2	L	L1	Discoloration - JP-8 & +100 Samples						CN	W	W	
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W		
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND							CN	W	W		
AVG. WT. (gms)	15.4751	15.4768	15.3855	15.3864	15.4662	15/4663											
GAIN / LOSS (gms)		+.0017		+.0009		+.0001							CN	W	W		
MICROSCOPY EVAL.																	
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS			
							JP-8		JP-8 + 100		JP-8 + 100 x4			GENERAL			
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4	
	COLOR (7 DAYS)	C2	C2	C2	C2	C2	C2	C	C2	C	C2	C	C2		W	W	W
	CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	36	10	227	10	657	253	50	4	300	57	569	241	150/600	O	O	W	
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY											
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	

NOTES:

Metallic Color: L = *Light (No Deposit)* L1 - L2 = *Discoloration/Deposits*
Fuel Color: C = *Clear* C1 - C6 = *Light to Dark*
Designations: NE = *Not Evaluated;* ND = *Not Detected;* BD = *Below Detection* P = *Pitting*
Comparisons: W = *Within Allowable Requirement;* O = *Outside Allowable Requirement*
OT = *Material Tested Beyond Temperature Range* CN = *Control*
N/A = *Not applicable;* LT = *Less than 500 ppb*
GT = *Greater than 500 ppb*
NSR = *No Spec. Req. and/or 4 (x) Additive Concentration*

DATE: 24 APR 98
UDRI TECH: A. BEHME
UTC ENG: J. LEONE
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W./MLSA: L. PERKINS
A.F. AUT. WL/POSF: S. A. ANDERSON

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	ILM.5	MATERIAL / IDENTITY:	INCO 625, NICKEL ALLOY, AMS 55990
TEST TEMPERATURE (°F)	200	USE:	ENGINE FUEL LINES & COMPONENTS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	20 OCT 94	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	LI	L	LI	L	LI					CN	W	W	
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND					CN	W	W		
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND					CN	W	W		
AVG. WT. (gms)	17.1228	17.1227	17.2875	17.2877	17.2053	17.2056									
GAIN / LOSS (gms)		-.0001		+.0002		+.0003					CN	W	W		
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL OBSERVATIONS		
							JP-8		JP-8 + 100		JP-8 + 100 x4			JP8	+100	X4
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST				
	COLOR (7 DAYS)	C	C2	C	C	C	C	C	C1	C	C1	C	C1		W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	56	34	208	158	635	423	108	39	248	131	912	410	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color: L = *Light (No Deposit)* L1 - L2 = *Discoloration/Deposits*
Fuel Color: C = *Clear* C1 - C6 = *Light to Dark*
Designations: NE = *Not Evaluated;* ND = *Not Detected;* BD = *Below Detection* P = *Pitting*
Comparisons: W = *Within Allowable Requirement;* O = *Outside Allowable Requirement*
OT = *Material Tested Beyond Temperature Range* CN = *Control*
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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	ILM.5	MATERIAL / IDENTITY:	INCO 625, NICKEL ALLOY, AMS 55990
TEST TEMPERATURE (°F)	325	USE:	ENGINE FUEL LINES & COMPONENTS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	23 NOV 94	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4						
	COLOR	L	L2	L	L1	L	L	Surface Deposits / Discoloration - JP-8						CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	Minimum Deposits - +100						CN	W	W
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND							CN	W	W
AVG. WT. (gms)	17.2607	17.2618	17.3816	17.3819	17.3208	17.3208									
GAIN / LOSS (gms)		+.0011		+.0003		.0000							CN	W	W
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							JP-8		JP-8 + 100		JP-8 + 100 x4			GENERAL OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
COLOR (7 DAYS)	C2	C3	C3	C3	C4	C3	C	C2	C	C2	C	C2		W	W	O
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	31	34	228	85	655	381	50	4	300	57	569	241	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color: L = *Light (No Deposit)* L1 - L2 = *Discoloration/Deposits*
 Fuel Color: C = *Clear* C1 - C6 = *Light to Dark*
 Designations: NE = *Not Evaluated;* ND = *Not Detected;* BD = *Below Detection* P = *Pitting*
 Comparisons: W = *Within Allowable Requirement;* O = *Outside Allowable Requirement*
 OT = *Material Tested Beyond Temperature Range* CN = *Control*
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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	ILM.6 /I.M.16	MATERIAL / IDENTITY:	INCO 718, NICKEL ALLOY, AMS 5596G
TEST TEMPERATURE (°F)	200	USE:	ENGINE FUEL LINES & COMPONENTS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	20 OCT 94	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS									
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION			
	JP-8		JP-8 +100		JP8+100 (X4)											
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4	
	COLOR	L	L	L	L	L	L					CN	W	W		
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND					CN	W	W			
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND					CN	W	W			
AVG. WT. (gms)	16.1202	16.1205	16.0297	16.0296	16.0787	16.0786										
GAIN / LOSS (gms)		+.0003		-.0001		-.0001						CN	W	W		
MICROSCOPY EVAL.																
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8	TEST RESULTS		
							GENERAL									
	JP-8						JP-8 + 100		JP-8 + 100 x4		MIN / MAX	OBSERVATIONS				
	7	28	7	28	7	28	PRE	POST	PRE	POST		PRE	POST	JP8	+100	X4
	COLOR (7 DAYS)	C	C2	C	C	C	C	C1	C	C1	C	C1		W	W	W
	CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST									
PS/M AT 72° F	54	35	219	153	651	433	108	39	248	131	912	410	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color: L = *Light (No Deposit)* L1 - L2 = *Discoloration/Deposits*
Fuel Color: C = *Clear* C1 - C6 = *Light to Dark*
Designations: NE = *Not Evaluated;* ND = *Not Detected;* BD = *Below Detection* P = *Pitting*
Comparisons: W = *Within Allowable Requirement;* O = *Outside Allowable Requirement*
OT = *Material Tested Beyond Temperature Range* CN = *Control*
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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	ILM.6 /I.M.16	MATERIAL / IDENTITY:	INCO 718, NICKEL ALLOY, AMS 5596G
TEST TEMPERATURE (°F)	325	USE:	ENGINE FUEL LINES & COMPONENTS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	23 NOV 94	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS										
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION				
	JP-8		JP-8 +100		JP8+100 (X4)												
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4								
	COLOR	L	L2	L	L1	L	L1	Surface Deposits - All Samples						CN	W	W	
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W		
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND							CN	W	W		
AVG. WT. (gms)	15.9657	15.9676	16.1168	16.1175	16.0261	16.0266											
GAIN / LOSS (gms)		-.0081		+.0007		+.0005							CN	W	W		
MICROSCOPY EVAL.																	
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8	TEST RESULTS			
							JP-8		JP-8 + 100		JP-8 + 100 x4			GENERAL OBSERVATIONS			
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST	MIN / MAX	JP8	+100	X4	
	COLOR (7 DAYS)	C2	C3	C2	C3	C2	C5	C	C2	C	C2	C	C2		W	W	W
	CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	38	11	227	13	649	203	50	4	300	57	569	241	150/600	O	W	W	
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY											
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	

NOTES:

Metallic Color: L = *Light (No Deposit)* L1 - L2 = *Discoloration/Deposits*
Fuel Color: C = *Clear* C1 - C6 = *Light to Dark*
Designations: NE = *Not Evaluated;* ND = *Not Detected;* BD = *Below Detection* P = *Pitting*
Comparisons: W = *Within Allowable Requirement;*
 OT = *Material Tested Beyond Temperature Range* O = *Outside Allowable Requirement*
 N/A = *Not applicable;* CN = *Control*
 GT = *Greater than 500 ppb* LT = *Less than 500 ppb*
 NSR = *No Spec. Req. and/or 4 (x) Additive Concentration*

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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	ILM.7	MATERIAL / IDENTITY:	STELLITE 30, CHROMIUM / CARBIDE
TEST TEMPERATURE (°F)	325	USE:	ENGINE FUEL LINES & COMPONENTS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	6 DEC 95	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS										
	RESULTS						OBSERVATIONS AND REFERENCES				OVERALL EVALUATION						
	JP-8		JP-8 +100		JP8+100 (X4)						JP8	+100	X4				
	PRE	POST	PRE	POST	PRE	POST											
COLOR	L	L2	L	L2	L	L1					CN	W	W				
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND					CN	W	W				
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND					CN	W	W				
AVG. WT. (gms)	20.6815	20.6814	20.7455	20.7450	20.5303	20.5295											
GAIN / LOSS (gms)		-.0001		-.0005		-.0008					CN	W	W				
MICROSCOPY EVAL.																	

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL OBSERVATIONS			
							JP-8		JP-8 + 100		JP-8 + 100 x4			JP8	+100	X4	
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST					
COLOR (7 DAYS)	C4	C5	C4	C5	C4	C5	C	C2	C	C2	C	C2		O	O	O	
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST											
PS/M AT 72° F	234	139	496	209	761	442	108	123	248	141	912	555	150/600	O	W	W	
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY											
Co	13	2	19	15	26	24	NE		NE		NE			NE	NE	NE	
Cr	2	2	30	45	10	59	NE		NE		NE			NE	NE	NE	
Ni	2	ND	1	ND	2	18	NE		NE		NE			NE	NE	NE	
Mo	ND	ND	ND	2	ND	3	NE		NE		NE			NE	NE	NE	

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	ILM.8 /I.M.18	MATERIAL / IDENTITY:	347 STAINLESS STEEL
TEST TEMPERATURE (°F)	325	USE:	ENGINE FUEL LINES & COMPONENTS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	20 OCT 94	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	LI	L	LI	L	LI	Minimum Surface Deposits / Discoloration - All Samples						CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	CN							W	W
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND	CN							W	W
AVG. WT. (gms)	15.9066	15.9074	15.8288	15.8299	15.8661	15.8661									
GAIN / LOSS (gms)		+.0008		+.0011		.0000							CN	W	W
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							GENERAL OBSERVATIONS									
	JP-8		JP-8 + 100		JP-8 + 100 x4		JP8	+100	X4							
	PRE	POST	PRE	POST	PRE	POST				MIN / MAX						
COLOR (7 DAYS)	C	C5	C	C5	C	C5	C	C2	C	C2	C	C2		O	O	O
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	53	4	228	14	665	360	50	4	300	57	569	241	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
3	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color: L = *Light (No Deposit)* L1 - L2 = *Discoloration/Deposits*
Fuel Color: C = *Clear* C1 - C6 = *Light to Dark*
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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	IIM9	MATERIAL / IDENTITY:	GREEK ASCOLOY, STAINLESS STEEL
TEST TEMPERATURE (°F)	200	USE:	ENGINE FUEL LINES & COMPONENTS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	20 OCT 94	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	LI	L	LI	L	LI					CN	W	W	
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND					CN	W	W		
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND					CN	W	W		
AVG. WT. (gms)	12.2655	12.2658	12.2628	12.2630	12.2904	12.2905									
GAIN / LOSS (gms)		+.0003		+.0002		+.0001						CN	W	W	
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							JP-8		JP-8 + 100		JP-8 + 100 x4			GENERAL OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
COLOR (7 DAYS)	C	C2	C	C	C	C	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	54	35	219	153	651	433	50	4	248	131	912	410	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color: L = *Light (No Deposit)* L1 - L2 = *Discoloration/Deposits*
Fuel Color: C = *Clear* C1 - C6 = *Light to Dark*
Designations: NE = *Not Evaluated;* ND = *Not Detected;* BD = *Below Detection* P = *Pitting*
Comparisons: W = *Within Allowable Requirement;* O = *Outside Allowable Requirement*
OT = *Material Tested Beyond Temperature Range* CN = *Control*
N/A = *Not applicable;* LT = *Less than 500 ppb*
GT = *Greater than 500 ppb*
NSR = *No Spec. Req. and/or 4 (x) Additive Concentration*

DATE: 24 APR 98
UDRI TECH: A. BEHME
UTC ENG: J. LEONE
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W./MLSA: L. PERKINS
A.F. AUT. WL/POSF: S.A. ANDERSON

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	IIM9	MATERIAL / IDENTITY:	GREEK ASCOLOY, STAINLESS STEEL
TEST TEMPERATURE (°F)	325	USE:	ENGINE FUEL LINES & COMPONENTS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	23 NOV 94	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS									
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION			
	JP-8		JP-8 +100		JP8+100 (X4)											
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4							
	COLOR	L	L2	L	L2	L	L1	Surface Deposits/ Discoloraion - JP-8 and +100						CN	W	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W	
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND							CN	W	W	
AVG. WT. (gms)	12.2892	12.2906	12.2251	12.2258	12.2965	12.2968										
GAIN / LOSS (gms)		+.0014		+.0007		+.0003							CN	W	W	
MICROSCOPY EVAL.																
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)							GENERAL		
														OBSERVATIONS		
	JP-8	JP-8 + 100		JP-8 + 100 x4		JP8	+100	X4								
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST	MIN / MAX	JP8	+100	X4
COLOR (7 DAYS)	C2	C2	C2	C2	C2	C2	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	40	9	229	13	650	242	50	4	300	57	569	241	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color: L = *Light (No Deposit)* L1 - L2 = *Discoloration/Deposits*
Fuel Color: C = *Clear* C1 - C6 = *Light to Dark*
Designations: NE = *Not Evaluated;* ND = *Not Detected;* BD = *Below Detection* P = *Pitting*
Comparisons: W = *Within Allowable Requirement;*
 OT = *Material Tested Beyond Temperature Range* O = *Outside Allowable Requirement*
 N/A = *Not applicable;* CN = *Control*
 GT = *Greater than 500 ppb* LT = *Less than 500 ppb*
 NSR = *No Spec. Req. and/or 4 (x) Additive Concentration*

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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	IIM10/IM19	MATERIAL / IDENTITY:	30302, AMS 5688H (S.S WIRE)
TEST TEMPERATURE (°F)	325	USE:	ENGINE FUEL LINES & COMPONENTS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	23 NOV 94	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS										
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION				
	JP-8		JP-8 +100		JP8+100 (X4)												
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4								
	COLOR	L	L2	L	L	L	L	Surface Deposits/ Discoloration - JP-8 Only						CN	W	W	
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W		
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND							CN	W	W		
AVG. WT. (gms)	2.1747	2.1750	2.0886	2.0887	2.2335	2.2335											
GAIN / LOSS (gms)		+.0003		+.0001		.0000							CN	W	W		
MICROSCOPY EVAL.																	
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL			
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS			
							PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4	
	COLOR (7 DAYS)	C3	C4	C3	C4	C3	C3	C	C2	C	C2	C	C2		O	O	W
	CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
	PS/M AT 72° F	133	23	247	33	555	214	108	123	248	141	912	555	150/600	O	O	W
	GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	

NOTES:

Metallic Color: L = *Light (No Deposit)* L1 - L2 = *Discoloration/Deposits*
Fuel Color: C = *Clear* C1 - C6 = *Light to Dark*
Designations: NE = *Not Evaluated;* ND = *Not Detected;* BD = *Below Detection* P = *Pitting*
Comparisons: W = *Within Allowable Requirement;* O = *Outside Allowable Requirement*
OT = *Material Tested Beyond Temperature Range* CN = *Control*
N/A = *Not applicable;* LT = *Less than 500 ppb*
GT = *Greater than 500 ppb*
NSR = *No Spec. Req. and/or 4 (x) Additive Concentration*

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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	IIM11/IM17	MATERIAL / IDENTITY:	440C, STAINLESS STEEL
TEST TEMPERATURE (°F)	325	USE:	ENGINE FUEL LINES & COMPONENTS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	3 MAR 95	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4						
	COLOR	L	L2	L	L1	L	L1	Heavy Discoloration -JP-8 Only							
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	CN	W	W						
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND	CN	W	W						
AVG. WT. (gms)	25.4359	25.4373	25.4543	25.4549	25.4178	25.4183									
GAIN / LOSS (gms)		+.0014		+.0006		+.0005	CN	W	W						
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
	728728728728						JP-8		JP-8 + 100		JP-8 + 100 x4			GENERAL OBSERVATIONS		
							PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
	COLOR (7 DAYS)	C2	C4	C4	C4	C4	C4	C	C2	C	C2	C	C2		O	O
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	163	43	258	69	562	305	108	123	248	141	912	555	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Fe	NE	44	NE	175	NE	260	NE		NE		NE			NE	NE	NE
Cr	NE	ND	NE	5	NE	5	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	P =	Pitting
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	IIM12/IM15	MATERIAL / IDENTITY:	304 STAINLESS STEEL
TEST TEMPERATURE (°F)	325	USE:	ENGINE FUEL LINES & COMPONENTS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	20 OCT 94	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4						
	COLOR	L	L3	L	L2	L	L1	Discoloration -JP-8 and +100						CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND							CN	W	W
AVG. WT. (gms)	15.6028	15.6033	15.4867	15.4869	15.4193	15.4194									
GAIN / LOSS (gms)		+.0005		+.0002		+.0001							CN	W	W
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							JP-8		JP-8 + 100		JP-8 + 100 x4			GENERAL OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
COLOR (7 DAYS)	C	C5	C	C5	C	C5	C	C2	C	C2	C	C2		O	O	O
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	51	4	229	53	662	306	50	4	300	57	569	241	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	IIM13/IM13	MATERIAL / IDENTITY:	316 STAINLESS STEEL
TEST TEMPERATURE (°F)	325	USE:	ENGINE FUEL LINES & COMPONENTS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	28 DEC 94	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4						
	COLOR	L	L2	L	L2	L	L1	Discoloration -JP-8 and +100						CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND							CN	W	W
AVG. WT. (gms)	14.7166	14.7171	14.7032	14.7045	13.9722	13.9721									
GAIN / LOSS (gms)		+.0004		+.0013		-.0001							CN	W	W
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)							GENERAL OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4	
COLOR (7 DAYS)	C2	C3	C3	C3	C3	C4	C	C2	C	C2	C	C2		W	W	O
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	34	11	225	19	669	171	50	4	300	57	569	241	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color: L = *Light (No Deposit)* L1 - L2 = *Discoloration/Deposits*
Fuel Color: C = *Clear* C1 - C6 = *Light to Dark*
Designations: NE = *Not Evaluated;* ND = *Not Detected;* BD = *Below Detection* P = *Pitting*
Comparisons: W = *Within Allowable Requirement;* O = *Outside Allowable Requirement*
OT = *Material Tested Beyond Temperature Range* CN = *Control*
N/A = *Not applicable;* LT = *Less than 500 ppb*
GT = *Greater than 500 ppb*
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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	IIM14/IM14	MATERIAL / IDENTITY:	321 STAINLESS STEEL
TEST TEMPERATURE (°F)	325	USE:	ENGINE FUEL LINES & COMPONENTS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	28 DEC 94	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	L3	L	L2	L	L2	Discoloration All Samples						CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	CN							W	W
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND	CN							W	W
AVG. WT. (gms)	19.5901	19.5907	19.3892	19.3895	19.3470	19.3470									
GAIN / LOSS (gms)		+.0006		+.0003		.0000							CN	W	W
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)							GENERAL OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4	
COLOR (7 DAYS)	C2	C3	C3	C3	C2	C3	C	C2	C	C2	C	C2		W	W	O
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	31	19	226	25	660	174	50	4	300	57	569	241	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color: L = *Light (No Deposit)* L1 - L2 = *Discoloration/Deposits*
Fuel Color: C = *Clear* C1 - C6 = *Light to Dark*
Designations: NE = *Not Evaluated;* ND = *Not Detected;* BD = *Below Detection* P = *Pitting*
Comparisons: W = *Within Allowable Requirement;* O = *Outside Allowable Requirement*
OT = *Material Tested Beyond Temperature Range* CN = *Control*
N/A = *Not applicable;* LT = *Less than 500 ppb*
GT = *Greater than 500 ppb*
NSR = *No Spec. Req. and/or 4 (x) Additive Concentration*

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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	IIM16	MATERIAL / IDENTITY:	AS1 51410 SS (AMS 5504-J)
TEST TEMPERATURE (°F)	325	USE:	ENGINE FUEL LINES & COMPONENTS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	28 DEC 94	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS										
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION				
	JP-8		JP-8 +100		JP8+100 (X4)												
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4								
	COLOR	L	L2	L	L1	L	L1	Discoloration All Samples						CN	W	W	
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W		
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND							CN	W	W		
AVG. WT. (gms)	15.7410	15.7419	15.3358	15.3358	15.5889	15.5885											
GAIN / LOSS (gms)		+.0009		.0000		-.0004							CN	W	W		
MICROSCOPY EVAL.																	
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL			
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS			
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4	
	COLOR (7 DAYS)	C2	C4	C3	C3	C2	C3	C	C2	C	C2	C	C2		O	W	W
	CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	32	16	221	35	654	180	108	39	248	131	912	410	150/600	O	O	W	
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY											
Cr	NE	ND	NE	ND	NE	ND	NE		NE		NE			NE	NE	NE	
Fe	NE	ND	NE	50	NE	500	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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 A.F. AUT. W./MLSA: L. PERKINS
 A.F. AUT. WL/POSF: S. A. ANDERSON

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	IIM17/IIM11	MATERIAL / IDENTITY:	440 STAINLESS STEEL
TEST TEMPERATURE (°F)	325	USE:	ENGINE FUEL LINES & COMPONENTS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	4 JAN 96	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS										
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION				
	JP-8		JP-8 +100		JP8+100 (X4)												
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4								
	COLOR	L	L2	L	L1	L	L1	Discoloration JP-8 Only / Deposits All Samples						CN	W	W	
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W		
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND							CN	W	W		
AVG. WT. (gms)	14.8677	14.8643	11.5992	11.5932	15.5772	15.5748											
GAIN / LOSS (gms)		-.0034		-.0060		-.0024							CN	W	W		
MICROSCOPY EVAL.																	
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8	TEST RESULTS			
							JP-8		JP-8 + 100		JP-8 + 100 x4			GENERAL			
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST	MIN / MAX	JP8	+100	X4	
	COLOR (7 DAYS)	C2	C2	C2	C2	C2	C2	C	C2	C	C2	C	C2		W	W	W
	CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	97	4	435	48	699	429	108	123	248	141	912	555	150/600	O	O	W	
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY											
Cr	2	ND	29	5	26	5	NE		NE		NE			NE	NE	NE	
Fe	12	44	118	175	185	260	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	IIM18	MATERIAL / IDENTITY:	CPM 10V, FERROUS
TEST TEMPERATURE (°F)	325	USE:	ENGINE FUEL LINES & COMPONENTS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	1 AUG 95	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS										
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION				
	JP-8		JP-8 +100		JP8+100 (X4)												
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4								
	COLOR	L	L2	L	L2	L	L2	Uniform Corrosion All Samples						CN	W	W	
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W		
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P							CN	W	W		
AVG. WT. (gms)	14.8677	14.8643	11.5992	11.5932	15.5772	15.5748	Pitting All Samples ~ Depth .0016"										
GAIN / LOSS (gms)		-.0034		-.0060		-.0024							CN	W	W		
MICROSCOPY EVAL.																	
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL			
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS			
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4	
	COLOR (7 DAYS)	C2	C3	C2	C2	C2	C3	C	C2	C	C2	C	C2		W	W	W
	CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	145	26	312	30	537	324	108	123	248	141	912	555	150/600	O	O	W	
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY											
Fe	50	180	200	320	1050	1600	NE		NE		NE			NE	NE	NE	
V	ND	ND	ND	60	30	110	NE		NE		NE			NE	NE	NE	
Cr	ND	6	10	8	15	12	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	IIM19/IM10	MATERIAL / IDENTITY:	C-355-T6, CAST ALUMINUM
TEST TEMPERATURE (°F)	325	USE:	ENGINE FUEL LINES & COMPONENTS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	21 DEC 94	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS										
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION				
	JP-8		JP-8 +100		JP8+100 (X4)												
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4								
	COLOR	L	L2	L	L1	L	L1	Heavy Deposits / Discoloration -JP-8						CN	W	W	
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W		
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND							CN	W	W		
AVG. WT. (gms)	1.0157	1.0155	.9658	.9657	1.0152	1.0151											
GAIN / LOSS (gms)		-.0002		-.0001		-.0001							CN	W	W		
MICROSCOPY EVAL.							Conductivity (%IACS) and Hardness Within Specification										
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8	TEST RESULTS			
							JP-8		JP-8 + 100		JP-8 + 100 x4			GENERAL OBSERVATIONS			
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST	MIN / MAX	JP8	+100	X4	
	COLOR (7 DAYS)	C2	C3	C2	C3	C3	C3	C	C2	C	C2	C	C2		W	W	W
	CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	29	35	230	97	690	339	50	4	300	57	569	241	150/600	O	O	W	
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY											
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	

NOTES:

Metallic Color: L = *Light (No Deposit)* L1 - L2 = *Discoloration/Deposits*
Fuel Color: C = *Clear* C1 - C6 = *Light to Dark*
Designations: NE = *Not Evaluated;* ND = *Not Detected;* BD = *Below Detection* P = *Pitting*
Comparisons: W = *Within Allowable Requirement;* O = *Outside Allowable Requirement*
OT = *Material Tested Beyond Temperature Range* CN = *Control*
N/A = *Not applicable;* LT = *Less than 500 ppb*
GT = *Greater than 500 ppb*
NSR = *No Spec. Req. and/or 4 (x) Additive Concentration*

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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	IIM20/IM11	MATERIAL / IDENTITY:	C-356-T6, CAST ALUMINUM
TEST TEMPERATURE (°F)	325	USE:	ENGINE FUEL LINES & COMPONENTS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	14 DEC 94	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS									
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION			
	JP-8		JP-8 +100		JP8+100 (X4)											
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4	
	COLOR	L	L2	L	L1	L	L1	Heavy Deposits / Discoloration -JP-8						CN	W	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W	
PITTING (MICROSCOPY)	ND	P	ND	ND	ND	ND							CN	W	W	
AVG. WT. (gms)	1.0157	1.0155	.9658	.9657	1.0152	1.0151	Minimum Pitting JP-8 Only									
GAIN / LOSS (gms)		-.0002		-.0001		-.0001							CN	W	W	
MICROSCOPY EVAL.							Conductivity (%IACS) and Hardness Within Specification									
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8	TEST RESULTS		
							JP-8		JP-8 + 100		JP-8 + 100 x4			GENERAL		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST	MIN / MAX	JP8	+100	X4
														OBSERVATIONS		
	COLOR (7 DAYS)	C2	C3	C2	C3	C3	C3	C	C2	C	C2	C	C2		W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	29	35	230	97	690	339	50	4	300	57	569	241	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color: L = *Light (No Deposit)* L1 - L2 = *Discoloration/Deposits*
Fuel Color: C = *Clear* C1 - C6 = *Light to Dark*
Designations: NE = *Not Evaluated;* ND = *Not Detected;* BD = *Below Detection* P = *Pitting*
Comparisons: W = *Within Allowable Requirement;* O = *Outside Allowable Requirement*
OT = *Material Tested Beyond Temperature Range* CN = *Control*
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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	IIM21	MATERIAL / IDENTITY:	A 286, SIVER PLATE, AMS 5525
TEST TEMPERATURE (°F)	200	USE:	ENGINE FUEL LINES & COMPONENTS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	1 DEC 96	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS										
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION				
	JP-8		JP-8 +100		JP8+100 (X4)												
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4								
	COLOR	L	L2	L	L1	L	L1	Voids In Silver Plate						CN	W	W	
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W		
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	Pitting In Voids - All Samples						CN	W	W		
AVG. WT. (gms)	15.9213	15.9212	16.1333	16.1332	15.8447	15.8446											
GAIN / LOSS (gms)		-.0001		-.0001		-.0001							CN	W	W		
MICROSCOPY EVAL.																	
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL			
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS			
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4	
	COLOR (7 DAYS)	C1	C2	C1	C1	C1	C1	C	C2	C	C2	C	C2		W	W	W
	CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	33	27	230	153	674	373	108	39	248	131	912	410	150/600	O	O	W	
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY											
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	

NOTES:

Metallic Color: L = *Light (No Deposit)* L1 - L2 = *Discoloration/Deposits*
Fuel Color: C = *Clear* C1 - C6 = *Light to Dark*
Designations: NE = *Not Evaluated;* ND = *Not Detected;* BD = *Below Detection* P = *Pitting*
Comparisons: W = *Within Allowable Requirement;*
OT = *Material Tested Beyond Temperature Range* O = *Outside Allowable Requirement*
N/A = *Not applicable;* CN = *Control*
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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	IIM21	MATERIAL / IDENTITY:	A 286, SIVER PLATE, AMS 5525
TEST TEMPERATURE (°F)	325	USE:	ENGINE FUEL LINES & COMPONENTS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	23 NOV 96	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS									
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION			
	JP-8		JP-8 +100		JP8+100 (X4)											
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4							
	COLOR	L	L3	L	L3	L	L3	Voids In Silver Plate / Discoloration All Samples						CN	W	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W	
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	Pitting In Voids - All Samples						CN	W	W	
AVG. WT. (gms)	15.8992	15.8998	15.8581	15.8586	15.8376	15.8376										
GAIN / LOSS (gms)		+.0006		+.0005		.0000							CN	W	W	
MICROSCOPY EVAL.																
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL		
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4	
	COLOR (7 DAYS)	C2	C2	C2	C2	C2	C	C2	C	C2	C	C2		W	W	W
	CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST									
PS/M AT 72° F	37	7	230	10	661	241	50	4	300	57	569	241	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Fe	5	22	250	150	100	106	NE		NE		NE			NE	NE	NE
Ag	12	ND	10	3	40	15	NE		NE		NE			NE	NE	NE
Fe (ICP)	ND	ND	52	69	128	120	NE		NE		NE			NE	NE	NE
Ag (ICP)	4	7	7	12	7	14	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	IIM22	MATERIAL / IDENTITY:	NITRALLOY, 135 MODIFIED
TEST TEMPERATURE (°F)	200	USE:	ENGINE FUEL LINES & COMPONENTS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	23 NOV 96	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS										
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION				
	JP-8		JP-8 +100		JP8+100 (X4)												
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4								
	COLOR	L	LI	L	LI	L	LI	Localized Uniform Corrosion - All Samples						CN	W	W	
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W		
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND							CN	W	W		
AVG. WT. (gms)	24.1812	24.1807	23.8826	23.8821	24.0495	24.0489											
GAIN / LOSS (gms)		-.0005		-.0005		-.0006							CN	W	W		
MICROSCOPY EVAL.																	
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8	TEST RESULTS			
							JP-8		JP-8 + 100		JP-8 + 100 x4			GENERAL OBSERVATIONS			
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST	MIN / MAX	JP8	+100	X4	
	COLOR (7 DAYS)	C1	C1	C1	C1	C1	C1	C	C1	C	C1	C	C1		W	W	W
	CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	232	106	534	326	978	576	108	39	248	131	912	410	150/600	O	W	W	
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY											
Fe	10	30	60	60	110	80	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	24 APR 98
UDRI TECH:	A. BEHME
UTC ENG:	J. LEONE
UDRI P.I. ENG:	D.H. KALT
A.F. AUT. W./MLSA:	L. PERKINS
A.F. AUT. WL/POSF	S. A. ANDERSON

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	IIM22	MATERIAL / IDENTITY:	NITRALLOY, 135 MODIFIED
TEST TEMPERATURE (°F)	325	USE:	ENGINE FUEL LINES & COMPONENTS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	23 NOV 96	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	LI	L	LI	L	LI	Localized Uniform Corrosion - All Samples						CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	CN							W	W
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND	CN							W	W
AVG. WT. (gms)	24.0570	24.0590	24.1775	24.1791	24.0172	24.0776									
GAIN / LOSS (gms)		+.0020		+.0016		+.0004							CN	W	W
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)							GENERAL		
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4	
COLOR (7 DAYS)	C4	C3	C4	C3	C4	C3	C	C1	C	C1	C	C1	W	W	W	
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	118	6	375	30	604	262	108	39	248	131	912	410	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Cr	12	26	1	3	2	8	NE		NE		NE		NE	NE	NE	
Al	21	6	12	ND	22	10	NE		NE		NE		NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE		NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE		NE	NE	NE	

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	P =	Pitting
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	IL.M.23.1	MATERIAL / IDENTITY:	LEADED BRONZE(TAP MS 285), SAW CUT
TEST TEMPERATURE (°F)	AMBIENT	USE:	ENGINE FUEL PUMP GEAR BEARING
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	10 MAY 95	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS									
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION			
	JP-8		JP-8 +100		JP8+100 (X4)											
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4							
	COLOR	L	LI	L	LI	L	LI	Deposits / Discoloration All Samples						CN	W	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W	
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND							CN	W	W	
AVG. WT. (gms)	14.7601	14.7604	14.7407	14.7407	14.7512	14.7515										
GAIN / LOSS (gms)		+.0003		.0000		+.0003	Selective Leaching Not Found						CN	W	W	
MICROSCOPY EVAL.																
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 70°F)						SPEC. RANGE FOR JP-8	TEST RESULTS		
														GENERAL		
	JP-8		JP-8 + 100		JP-8 + 100 x4		MIN / MAX	OBSERVATIONS								
	7	28	7	28	7	28		JP8	+100	X4						
	COLOR (7 DAYS)	C	C	C	C	C	C	C	C1	C	C1	C	C1		W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	167	68	303	276	563	576	108	123	248	141	912	555	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Pb	<5	ND	50	ND	150	ND	NE		NE		NE			NE	NE	NE
Cu	280	50	330	50	490	50	NE		NE		NE			NE	NE	NE
Sn	25	ND	50	ND	50	ND	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	IL.M.23.1	MATERIAL / IDENTITY:	LEADED BRONZE(TAP MS 285), SAW CUT
TEST TEMPERATURE (°F)	200	USE:	ENGINE FUEL PUMP GEAR BEARING
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	10 MAY 95	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS							
	RESULTS						OBSERVATIONS AND REFERENCES					OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)							JP8	+100	X4
	PRE	POST	PRE	POST	PRE	POST								
	COLOR	L	L2	L	L2	L	L2	Deposits / Discoloration All Samples					CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND						CN	W	W
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	Pitting All Samples					CN	W	W
AVG. WT. (gms)	14.7785	14.7785	14.6815	14.6817	14.7123	14.7124								
GAIN / LOSS (gms)		.0000		+.0002		+.0001	Selective Leaching Not Found					CN	W	W
MICROSCOPY EVAL.														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 70°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL		
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
	COLOR (7 DAYS)	C2	C1	C1	C2	C2	C1	C	C1	C	C1	C		C1	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	147	59	300	216	569	522	108	123	248	141	912	555	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Pb	200	ND	100	ND	100	ND	NE		NE		NE			NE	NE	NE
Cu	67	15	105	75	140	75	NE		NE		NE			NE	NE	NE
Sn	50	ND	50	ND	50	ND	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	IL.M.23.1	MATERIAL / IDENTITY:	LEADED BRONZE(TAP MS 285), SAW CUT
TEST TEMPERATURE (°F)	325	USE:	ENGINE FUEL PUMP GEAR BEARING
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	7 SEP 94	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4						
	COLOR	L	L3	L	L3	L	L3	Deposits / Discoloration All Samples						W	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	Pitting All Samples						W	W	W
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P									
AVG. WT. (gms)	14.8183	14.8123	15.0083	15.0061	16.0856	16.0818									
GAIN / LOSS (gms)		-.0010		-.0022		-.0038							W	W	W
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 70°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							JP-8		JP-8 + 100		JP-8 + 100 x4			GENERAL OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
COLOR (7 DAYS)	C5	C5	C4	C4	C3	C3	C	C1	C	C1	C	C1		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	167	68	303	276	563	576	108	123	248	141	912	555	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Pb	2000	ND	7000	ND	10,000	ND	NE		NE		NE			NE	NE	NE
Cu	500	550	1800	800	3000	1200	NE		NE		NE			NE	NE	NE
Sn	ND	ND	ND	ND	ND	ND	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	ILM.23.2	MATERIAL / IDENTITY:	LEADED BRONZE(TAP MS 285),POLISHED CYLINDER, END DRYLUB
TEST TEMPERATURE (°F)	Ambient	USE:	ENGINE FUEL PUMP GEAR BEARING
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	10 MAY 95	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS										
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION				
	JP-8		JP-8 +100		JP8+100 (X4)												
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4								
	COLOR	L	LI	L	LI	L	LI	Minimum Deposits / Discoloration All Samples						CN	W	W	
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	Voids In Coating						CN	W	W		
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND							CN	W	W		
AVG. WT. (gms)	14.7601	14.7604	14.7407	14.7407	14.7512	14.7515											
GAIN / LOSS (gms)		+.0003		.0000		+.0003	Selective Leaching of Pb Not Present						CN	W	W		
MICROSCOPY EVAL.																	
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 70°F)						SPEC. RANGE FOR JP-8	TEST RESULTS			
							JP-8		JP-8 + 100		JP-8 + 100 x4			GENERAL OBSERVATIONS			
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST	MIN / MAX	JP8	+100	X4	
	COLOR (7 DAYS)	C	C1	C	C1	C	C1	C	C	C	C	C	C		W	W	W
	CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	167	68	303	276	563	576	NE	NE	298	273	563	540	150/600	O	W	W	
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY											
Pb	<5	ND	50	ND	150	ND	NE		NE		NE			NE	NE	NE	
Cu	280	50	330	50	490	50	NE		NE		NE			NE	NE	NE	
Sn	25	ND	50	ND	50	ND	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	IL.M.23.2	MATERIAL / IDENTITY:	LEADED BRONZE(TAP MS 285),POLISHED CYLINDER, END DRYLUB
TEST TEMPERATURE (°F)	200	USE:	ENGINE FUEL PUMP GEAR BEARING
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	10 MAY 95	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4						
	COLOR	L	L1	L	L1	L	L1	Minimum Discoloration / Deposits						CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	Voids In Coating						CN	W	W
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	Minimum Pitting						CN	W	W
AVG. WT. (gms)	14.7785	14.7785	14.6815	14.6817	14.7123	14.7124									
GAIN / LOSS (gms)		.0000		+.0002		+.0001	Selective Leaching Of Pb Not Present						CN	W	W
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							JP-8		JP-8 + 100		JP-8 + 100 x4			GENERAL		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		OBSERVATIONS		
	JP8	+100	X4													
COLOR (7 DAYS)	C2	C1	C1	C2	C2	C1	C	C	C	C	C	C		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	147	59	300	216	569	522	108	39	248	131	912	410	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Pb	200	ND	100	ND	100	ND	NE		NE		NE			NE	NE	NE
Cu	67	15	105	75	140	75	NE		NE		NE			NE	NE	NE
Sn	50	ND	50	ND	50	ND	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	IL.M.23.2	MATERIAL / IDENTITY:	LEADED BRONZE (TAP MS 285), Cu, POLISHED EXCEPT D.F. END
TEST TEMPERATURE (°F)	325	USE:	ENGINE FUEL PUMP GEAR BEARING
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	26 MAR 96	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS										
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION				
	JP-8		JP-8 +100		JP8+100 (X4)												
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4								
	COLOR	L	L2	L	L2	L	L2	Discoloration / Deposits All Samples						CN	W	W	
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	Voids in Coating						CN	W	W		
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	Pitting All Samples						CN	W	W		
AVG. WT. (gms)	14.7343	14.7347	14.7221	14.7216	14.8250	14.8246											
GAIN / LOSS (gms)		+.0004		-.0005		-.0004	Selective Leaching Of Pb Not Present						CN	W	W		
MICROSCOPY EVAL.																	
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS			
							JP-8		JP-8 + 100		JP-8 + 100 x4			GENERAL			
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4	
	COLOR (7 DAYS)	C2	C2	C2	C2	C2	C2	C	C	C	C	C	C		W	W	W
	CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	105	9	442	35	751	334	108	39	248	131	912	410	150/600	O	W	W	
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY											
Pb	127	NE	130	NE	145	NE	NE		NE		NE			NE	NE	NE	
Cu	565	NE	540	NE	620	NE	NE		NE		NE			NE	NE	NE	
Sn	47	NE	53	NE	45	NE	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	24 APR 98
UDRI TECH:	A. BEHME
UTC ENG:	J. LEONE
UDRI P.I. ENG:	D.H. KALT
A.F. AUT. W./MLSA:	L. PERKINS
A.F. AUT. WL/POSF	S. A. ANDERSON

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	IL.M.23.3	MATERIAL / IDENTITY:	LEADED BRONZE (TAP MS 285), Cu , INDIUM CLY., D.F. END
TEST TEMPERATURE (°F)	325	USE:	ENGINE FUEL PUMP GEAR BEARING
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	7 FEB 96	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4						
	COLOR	L	L2	L	L2	L	L2	Discoloration / Deposits All Samples						CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	Voids in Coating						CN	W	W
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	Pitting All Samples						CN	W	W
AVG. WT. (gms)	14.7580	14.7577	14.7032	14.7026	14.7333	14.7328									
GAIN / LOSS (gms)		-.0003		-.0006		-.0005	Selective Leaching Of Pb Not Present						CN	W	W
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)							GENERAL OBSERVATIONS		
	JP-8		JP-8 + 100		JP-8 + 100 x4		JP8	+100	X4							
	7	28	7	28	7	28				PRE	POST	PRE	POST	PRE	POST	
COLOR (7 DAYS)	C3	C3	C3	C3	C3	C3	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	100	5	479	85	815	379	108	123	248	141	912	555	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Cu	77	170	170	109	150	210	NE		NE		NE			NE	NE	NE
Pb	50	ND	400	200	980	200	NE		NE		NE			NE	NE	NE
Sn	90	ND	90	ND	92	ND	NE		NE		NE			NE	NE	NE
In	78	3	664	33	980	50	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	IL.M.23.4	MATERIAL / IDENTITY:	LEADED BRONZE(TAP MS285),INDIUM CTD EXCEPT D.F. LUBE END
TEST TEMPERATURE (°F)	325	USE:	ENGINE FUEL PUMP GEAR BEARING
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	21 FEB 96	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4						
	COLOR	L	LI	L	LI	L	LI	Discoloration / Deposits All Samples						CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	Voids in Coating						CN	W	W
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	Pitting All Samples						CN	W	W
AVG. WT. (gms)	14.7488	14.7485	14.7394	14.7388	14.6863	14.6859									
GAIN / LOSS (gms)		-.0003		-.0006		-.0004	Selective Leaching Of Pb Not Present						CN	W	W
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							JP-8		JP-8 + 100		JP-8 + 100 x4			GENERAL OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
COLOR (7 DAYS)	C3	C3	C3	C3	C3	C3	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	89	19	438	60	753	325	108	123	248	141	912	555	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Cu	15	NE	42	NE	77	NE	NE		NE		NE			NE	NE	NE
Pb	150	NE	500	NE	400	NE	NE		NE		NE			NE	NE	NE
Sn	ND	NE	ND	NE	ND	NE	NE		NE		NE			NE	NE	NE
In	20	NE	650	NE	895	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	IL.M.23.4	MATERIAL / IDENTITY:	LEADED BRONZE(TAP MS285),INDIUM CTD EXCEPT D.F. LUBE END
TEST TEMPERATURE (°F)	400	USE:	ENGINE FUEL PUMP GEAR BEARING
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	20 FEB 96	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS										
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION				
	JP-8		JP-8 +100		JP8+100 (X4)												
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4								
	COLOR	L	L2	L	L2	L	L2	Discoloration / Deposits All Samples						CN	W	W	
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	Voids in Coating						CN	W	W		
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	Pitting All Samples						CN	W	W		
AVG. WT. (gms)	14.7281	14.7280	14.8062	14.8055	14.6750	14.6742											
GAIN / LOSS (gms)		-.0001		-.0007		-.0008	Selective Leaching Of Pb Not Present						CN	W	W		
MICROSCOPY EVAL.																	
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 400°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL			
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS			
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4	
	COLOR (7 DAYS)	C2	C3	C2	C3	C2	C3	C	C3	C	C3	C	C3		W	W	W
	CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	101	3	445	10	771	242	108	5	248	5	912	428	150/600	O	O	W	
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY											
Cu	40	NE	580	NE	560	NE	NE		NE		NE			NE	NE	NE	
Pb	500	NE	1000	NE	3000	NE	NE		NE		NE			NE	NE	NE	
Sn	ND	NE	ND	NE	ND	NE	NE		NE		NE			NE	NE	NE	
In	105	NE	860	NE	1400	NE	NE		NE		NE			NE	NE	NE	

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE: 24 APR 98
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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>II.M.24 /I.M.20</u>	MATERIAL / IDENTITY:	<u>17-4 pH STAINLESS STEEL</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>ENGINE FUEL LINES & COMPONENTS</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>23 NOV 94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4						
	COLOR	L	L2	L	L1	L	L	CN	W	W					
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	Surface Deposits - JP-8 and +100 Samples			CN	W	W			
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P	Minimum Pitting - All Samples			CN	W	W			
AVG. WT. (gms)	15.9746	15.9753	15.5620	15.5621	15.7797	15.7796									
GAIN / LOSS (gms)		+.0007		+.0001		-.0001									
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							JP-8		JP-8 + 100		JP-8 + 100 x4			GENERAL		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
COLOR (7 DAYS)	C2	C2	C2	C2	C2	C2	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	37	5	227	15	648	250	50	4	300	57	569	241	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color: L = *Light (No Deposit)* L1 - L2 = *Discoloration/Deposits*
 Fuel Color: C = *Clear* C1 - C6 = *Light to Dark*
 Designations: NE = *Not Evaluated;* ND = *Not Detected;* BD = *Below Detection* P = *Pitting*
 Comparisons: W = *Within Allowable Requirement;* O = *Outside Allowable Requirement*
 OT = *Material Tested Beyond Temperature Range* CN = *Control*
 N/A = *Not applicable;* LT = *Less than 500 ppb*
 GT = *Greater than 500 ppb*
 NSR = *No Spec. Req. and/or 4 (x) Additive Concentration*

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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>ILM.25</u>	MATERIAL / IDENTITY:	<u>IN 200, NICKEL</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>ENGINE FUEL LINES & COMPONENTS</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>2 MAR 95</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS									
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION			
	JP-8		JP-8 +100		JP8+100 (X4)											
	PRE	POST	PRE	POST	PRE	POST										
	COLOR	L	LI	L	LI	L	LI	Localized Discoloration / Deposits All Samples						JP8	+100	X4
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W	
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND							CN	W	W	
AVG. WT. (gms)	18.4290	18.4292	18.4988	18.4992	18.3699	18.3702										
GAIN / LOSS (gms)		+.0002		+.0004		+.0004							CN	W	W	
MICROSCOPY EVAL.																
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 200°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL		
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
COLOR (7 DAYS)	C2	C2	C1	C1	C1	C1	C	C1	C	C1	C	C1		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	164	54	280	251	649	471	108	39	248	131	912	410	150/600	O	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Cr	<10	<10	<10	<10	<10	<10	NE		NE		NE			NE	NE	NE
Ni	<10	<10	<10	<10	<10	<10	NE		NE		NE			NE	NE	NE
Fe	40	60	50	140	18	300	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>ILM.25</u>	MATERIAL / IDENTITY:	<u>IN 200, NICKEL</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>ENGINE FUEL LINES & COMPONENTS</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>3 MAR 95</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS										
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION				
	JP-8		JP-8 +100		JP8+100 (X4)												
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4		
	COLOR	L	L2	L	L2	L	L1	Discoloration JP-8 and +100 Samples						CN	W	W	
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	CN							W	W		
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND	CN							W	W		
AVG. WT. (gms)	18.3401	18.3436	18.4225	18.4246	18.5897	18.5908											
GAIN / LOSS (gms)		+.0035		+.0021		+.0011							CN	W	W		
MICROSCOPY EVAL.																	
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL			
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS			
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4	
	COLOR (7 DAYS)	C3	C3	C3	C3	C3	C3	C	C2	C	C2	C	C2		W	W	W
	CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	164	13	257	43	558	194	108	123	248	141	912	555	150/600	O	O	W	
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY											
Cr	10	5	10	5	60	5	NE		NE		NE			NE	NE	NE	
Ni	10	390	10	580	140	940	NE		NE		NE			NE	NE	NE	
Fe	10	40	10	40	300	185	NE		NE		NE			NE	NE	NE	
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE	

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>ILM.26</u>	MATERIAL / IDENTITY:	<u>STAINLESS STEEL, BRAZED NOZZLES</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>ENGINE , AUGMENTER SPRAY BAR</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>13 FEB 97</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	L1	L	L1	L	L1						CN	W	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND						CN	W	W	
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND						CN	W	W	
AVG. WT. (gms)	5.6728	5.6729	6.1740	6.1736	6.9078	6.9074									
GAIN / LOSS (gms)		+.0001		-.0004		-.0004						CN	W	W	
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)							GENERAL OBSERVATIONS		
	JP-8		JP-8 + 100		JP-8 + 100 x4		JP8	+100	X4							
	7	28	7	28	7	28				PRE	POST	PRE		POST	PRE	POST
COLOR (7 DAYS)	C3	C3	C3	C4	C3	C4	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	29	10	221	47	609	285	50	4	300	57	569	241	150/600	O	O	O
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Ni	NE	40	NE	60	NE	60	NE		NE		NE			NE	NE	NE
Cr	NE	<5	NE	<5	NE	<5	NE		NE		NE			NE	NE	NE
Mo	NE	<20	NE	<20	NE	<20	NE		NE		NE			NE	NE	NE
Ti	NE	<5	NE	<5	NE	<5	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	<u>24 APR 98</u>
UDRI TECH:	<u>A. BEHME</u>
UTC ENG:	<u>J. LEONE</u>
UDRI P.I ENG:	<u>D.H. KALT</u>
A.F. AUT. W./MLSA:	<u>L. PERKINS</u>
A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>II.M.27 /I.M.34</u>	MATERIAL / IDENTITY:	<u>MONEL 400, NICKEL & COPPER</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>AIRFRAME / ENGINE FUEL SYSTEM</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>6 DEC 95</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	L1	L	L1	L	L1	Discoloration / Localized Uniform Corrosion All Samples						CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	CN							W	W
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND	CN							W	W
AVG. WT. (gms)	15.8205	15.8175	15.7782	15.7762	15.6879	15.6849									
GAIN / LOSS (gms)		-.0030		-.0020		-.0030							CN	W	W
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)							GENERAL OBSERVATIONS		
	JP-8		JP-8 + 100		JP-8 + 100 x4		JP8	+100	X4							
	7	28	7	28	7	28				PRE	POST	PRE		POST	PRE	POST
COLOR (7 DAYS)	C4	C5	C4	C5	C4	C5	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	235	162	500	210	757	482	108	123	248	141	912	555	150/600	W	W	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Ni	160	360	270	610	830	840	NE		NE		NE			NE	NE	NE
Cu	790	1310	850	1070	1060	1900	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	<u>24 APR 98</u>
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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>ILM.28</u>	MATERIAL / IDENTITY:	<u>INCOLOY 909</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>ENGINE FUEL LINES & COMPONENTS</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>17 OCT 96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS						
	RESULTS						OBSERVATIONS AND REFERENCES				OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)						JP8	+100	X4
	PRE	POST	PRE	POST	PRE	POST							
	COLOR	L	L1	L	L1	L	L1	Discoloration / Deposits - All Samples				CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND					CN	W	W
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND					CN	W	W
AVG. WT. (gms)	11.2295	11.2294	11.7097	11.7096	11.6281	11.6278							
GAIN / LOSS (gms)		-.0001		-.0001		-.0003					CN	W	W
MICROSCOPY EVAL.													

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8	TEST RESULTS		
							JP-8		JP-8 + 100		JP-8 + 100 x4			GENERAL OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		MIN / MAX	JP8	+100
COLOR (7 DAYS)	C6	C6	C6	C6	C6	C6	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	205	94	513	75	890	178	108	123	248	141	912	555	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Fe	10	NE	90	NE	200	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color: L = *Light (No Deposit)* L1 - L2 = *Discoloration/Deposits*
 Fuel Color: C = *Clear* C1 - C6 = *Light to Dark*
 Designations: NE = *Not Evaluated;* ND = *Not Detected;* BD = *Below Detection* P = *Pitting*
 Comparisons: W = *Within Allowable Requirement;* O = *Outside Allowable Requirement*
 OT = *Material Tested Beyond Temperature Range* CN = *Control*
 N/A = *Not applicable;* LT = *Less than 500 ppb*
 GT = *Greater than 500 ppb*
 NSR = *No Spec. Req. and/or 4 (x) Additive Concentration*

DATE: 24 APR 98
 UDRI TECH: A. BEHME
 UTC ENG: J. LEONE
 UDRI P.I. ENG: D.H. KALT
 A.F. AUT. W./MLSA: L. PERKINS
 A.F. AUT. WL/POSF: S. A. ANDERSON

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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>ILM.29</u>	MATERIAL / IDENTITY:	<u>Ti 6-2-4-2, TITANIUM, AMS 4919C</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>ENGINE FUEL LINES & COMPONENTS</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>6 DEC 95</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS						
	RESULTS						OBSERVATIONS AND REFERENCES				OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)						JP8	+100	X4
	PRE	POST	PRE	POST	PRE	POST							
COLOR	L	L	L	L	L	L	Minimum Discoloration All Samples				CN	W	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND					CN	W	W
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND					CN	W	W
AVG. WT. (gms)	9.2102	9.2100	9.1022	9.1022	8.9269	8.9266							
GAIN / LOSS (gms)		-.0002		.0000		-.0003					CN	W	W
MICROSCOPY EVAL.													

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8	TEST RESULTS		
							JP-8		JP-8 + 100		JP-8 + 100 x4			GENERAL OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		MIN / MAX	JP8	+100
COLOR (7 DAYS)	C3	C4	C3	C5	C3	C4	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	239	121	543	112	757	367	108	123	248	141	912	555	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Fe	ND	20	ND	30	1	17	NE		NE		NE			NE	NE	NE
	ND	30	12	44	16	35	NE		NE		NE			NE	NE	NE
	ND	ND	ND	ND	ND	ND	NE		NE		NE			NE	NE	NE
	ND	ND	ND	ND	ND	ND	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color: L = *Light (No Deposit)* L1 - L2 = *Discoloration/Deposits*
 Fuel Color: C = *Clear* C1 - C6 = *Light to Dark*
 Designations: NE = *Not Evaluated;* ND = *Not Detected;* BD = *Below Detection* P = *Pitting*
 Comparisons: W = *Within Allowable Requirement;* O = *Outside Allowable Requirement*
 OT = *Material Tested Beyond Temperature Range* CN = *Control*
 N/A = *Not applicable;* LT = *Less than 500 ppb*
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 NSR = *No Spec. Req. and/or 4 (x) Additive Concentration*

DATE: 24 APR 98
 UDRI TECH: A. BEHME
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 A.F. AUT. W./MLSA: L. PERKINS
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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>ILM.30</u>	MATERIAL / IDENTITY:	<u>HAYNES 188 (Co, Cr, Ni)</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>ENGINE FUEL LINES & COMPONENTS</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>6 DEC 95</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	LI	L	LI	L	LI	Discoloration - JP-8 & +100 Samples						CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	CN							W	W
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND	CN							W	W
AVG. WT. (gms)	13.8204	13.8201	13.8170	13.8169	13.8115	13.810									
GAIN / LOSS (gms)		-.0003		-.0001		-.0005							CN	W	W
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)							OBSERVATIONS		
	JP-8		JP-8 + 100		JP-8 + 100 x4		JP8	+100	X4							
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		MIN / MAX	JP8	+100
COLOR (7 DAYS)	C3	C4	C3	C4	C3	C4	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	240	126	496	117	758	314	108	123	248	141	912	555	150/600	O	O	W
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Co	12	ND	18	5	27	18	NE		NE		NE			NE	NE	NE
Cr	1	2	3	7	10	66	NE		NE		NE			NE	NE	NE
Ni	ND	ND	3	4	9	26	NE		NE		NE			NE	NE	NE
W	ND	ND	ND	ND	ND	ND	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	<u>24 APR 98</u>
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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>ILM.31</u>	MATERIAL / IDENTITY:	<u>HAYNES 214 (Co, Cr, Ni)</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>ENGINE FUEL LINES & COMPONENTS</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>NTP</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4						
COLOR	NE	NE	NE	NE	NE	NE						NE	NT	NT	
PITTING (VISUAL)	NE	NE	NE	NE	NE	NE						NE	NT	NT	
PITTING (MICROSCOPY)	NE	NE	NE	NE	NE	NE						NE	NT	NT	
AVG. WT. (gms)	NE	NE	NE	NE	NE	NE						NE	NT	NT	
GAIN / LOSS (gms)		NE		NE		NE						NE	NT	NT	
MICROSCOPY EVAL.	NE	NE	NE	NE	NE	NE						NE	NT	NT	

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							JP-8		JP-8 + 100		JP-8 + 100 x4			GENERAL		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE		NE	NE	NE
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	150/600	NE	NE	NE
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE			NE				NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE			NE				NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE			NE				NE	NE	NE

NOTES:

Metallic Color:	L =	<i>Light (No Deposit)</i>	L1 - L2 =	<i>Discoloration/Deposits</i>
Fuel Color:	C =	<i>Clear</i>	C1 - C6 =	<i>Light to Dark</i>
Designations:	NE =	<i>Not Evaluated;</i>	ND =	<i>Not Detected;</i> BD = <i>Below Detection</i>
Comparisons:	W =	<i>Within Allowable Requirement;</i>	O =	<i>Outside Allowable Requirement</i>
	OT =	<i>Material Tested Beyond Temperature Range</i>	CN =	<i>Control</i>
	N/A =	<i>Not applicable;</i>	LT =	<i>Less than 500 ppb</i>
	GT =	<i>Greater than 500 ppb</i>		
	NSR =	<i>No Spec. Req. and/or 4 (x) Additive Concentration</i>		

DATE:	<u>24 APR 98</u>
UDRI TECH:	<u>A. BEHME</u>
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A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>ILM.32.1</u>	MATERIAL / IDENTITY:	<u>MET 162(AS CAST ALLOY 310) AMS 7902 BERYLLIUM ALLOY</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>ENGINE FUEL SYSTEM</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>27 AUG 96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	L2	L	L2	L	L2	Samples Soaked in Water - 24 Sep 96 - 9 Oct 96						CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	45 Minute Power Outage						CN	W	W
PITTING (MICROSCOPY)	ND	P	ND	P	ND	P							CN	W	W
AVG. WT. (gms)	7.9519	7.9545	7.5858	7.5368	7.5331	7.5899	Localized Surface Deposits All Samples								
GAIN / LOSS (gms)		+.0026		-.0490		+.0568	Minimum Pitting All Samples						CN	W	W
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL OBSERVATIONS		
							JP-8		JP-8 + 100		JP-8 + 100 x4			JP8	+100	X4
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST				
COLOR (7 DAYS)	C6	C6	C6	C6	C6	C6	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	184	78	536	71	949	89	108	123	248	141	912	555	150/600	O	O	O
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	<u>24 APR 98</u>
UDRI TECH:	<u>A. BEHME</u>
UTC ENG:	<u>J. LEONE</u>
UDRI P.I. ENG:	<u>D.H. KALT</u>
A.F. AUT. W./MLSA:	<u>L. PERKINS</u>
A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>IL.M.32.2</u>	MATERIAL / IDENTITY:	<u>MET 162 (MACH. SURFACES 157), AMS 7902 BERYLLIUM ALLOY</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>ENGINE FUEL SYSTEM</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>27 AUG 96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS							
	RESULTS						OBSERVATIONS AND REFERENCES					OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)							JP8	+100	X4
	PRE	POST	PRE	POST	PRE	POST								
COLOR	L	L2	L	L2	L	L2	Samples Soaked in Water - 24 Sep 96 - 9 Oct 96					CN	W	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	45 Minute Power Outage					CN	W	W
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND						CN	W	W
AVG. WT. (gms)	6.2444	6.2442	6.0792	6.0829	6.4465	6.4460	Surface Depoits All Samples							
GAIN / LOSS (gms)		-.0002		+.0037		-.0005						CN	W	W
MICROSCOPY EVAL.														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8	TEST RESULTS GENERAL OBSERVATIONS		
							JP-8		JP-8 + 100		JP-8 + 100 x4		MIN / MAX	JP8	+100	X4
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST				
COLOR (7 DAYS)	C6	C6	C6	C6	C6	C6	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	175	88	533	92	928	74	108	123	248	141	912	555	150/600	O	O	O
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>IL.M.32.3</u>	MATERIAL / IDENTITY:	<u>Met (AM162, ROLLED STD. GRIND FINISH), AMS 7902B</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>ENGINE FUEL SYSTEM</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>27 AUG 96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS							
	RESULTS						OBSERVATIONS AND REFERENCES					OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)							JP8	+100	X4
	PRE	POST	PRE	POST	PRE	POST								
	COLOR	L	L1	L	L1	L	L1	Surface Deposits All Samples					CN	W
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND						CN	W	W
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND						CN	W	W
AVG. WT. (gms)	4.6667	4.6662	4.4884	4.4886	4.7171	4.7173								
GAIN / LOSS (gms)		-.0005		+.0002		+.0002						CN	W	W
MICROSCOPY EVAL.														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL		
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
	COLOR (7 DAYS)	C6	C6	C6	C6	C5	C6	C	C2	C	C2	C		C2		O
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	193	76	562	80	945	93	108	123	248	141	912	555	150/600	O	W	O
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Al																
Be																

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	ILM.33	MATERIAL / IDENTITY:	UNS C17200 Be Cu SPRING
TEST TEMPERATURE (°F)	325	USE:	ENGINE FUEL LINES & COMPONENTS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	17 OCT 96	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS									
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION			
	JP-8		JP-8 +100		JP8+100 (X4)											
	PRE	POST	PRE	POST	PRE	POST										
	COLOR	L	L3	L	L2	L	L2	Severe Discoloration - One Side of Sample Only - All samples						JP8	+100	X4
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND							CN	W	W	
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND							CN	W	W	
AVG. WT. (gms)	13.8718	13.8701	14.6320	14.6303	14.2309	14.2293										
GAIN / LOSS (gms)		-.0017		-.0017		-.0016							CN	W	W	
MICROSCOPY EVAL.																
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS GENERAL		
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
	COLOR (7 DAYS)	C6	C6	C5	C6	C5	C6	C	C2	C	C2	C	C2		W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	211	148	509	168	901	293	108	123	248	141	912	555	150/600	O	O	O
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
Cu	160	NE	630	NE	650	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>IIM34</u>	MATERIAL / IDENTITY:	<u>INCO 718 DIFFUSION BONDED</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>ENGINE FUEL LINES & COMPONENTS</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /92 POSF 2926</u>
TEST DATE START:	<u>13 FEB 97</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS									
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION			
	JP-8		JP-8 +100		JP8+100 (X4)											
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4	
	COLOR	L	LI	L	LI	L	LI					CN	W	W		
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND					CN	W	W			
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND					CN	W	W			
AVG. WT. (gms)	2.0604	2.0604	1.4073	1.4073	1.7095	1.7095										
GAIN / LOSS (gms)		.0000		.0000		.0000					CN	W	W			
MICROSCOPY EVAL.																
FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
														GENERAL		
														OBSERVATIONS		
	7	28	7	28	7	28	JP-8	JP-8 + 100	JP-8 + 100 x4	JP8	+100	X4				
	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	MIN / MAX	JP8	+100	X4
COLOR (7 DAYS)	C2	C2	C3	C2	C2	C3	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	233	15	406	42	661	361	50	4	300	57	569	241	150/600	O	O	O
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>IIM35</u>	MATERIAL / IDENTITY:	<u>Si C REINFORCED Ti MMC</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>ENGINE FUEL LINES & COMPONENTS</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /92 POSF 2926</u>
TEST DATE START:	<u>13 FEB 97</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	LI	L	LI	L	LI					CN	W	W	
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND					CN	W	W		
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND					CN	W	W		
AVG. WT. (gms)	5.9608	5.9608	7.8863	7.8863	5.9709	5.9707									
GAIN / LOSS (gms)		.0000		.0000		-.0002						CN	W	W	
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							JP-8		JP-8 + 100		JP-8 + 100 x4			GENERAL		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		OBSERVATIONS		
	JP8	+100	X4													
COLOR (7 DAYS)	C2	C2	C5	C4	C3	C3	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	233	41	408	90	660	432	50	4	300	57	569	241	150/600	O	O	O
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>IIM36</u>	MATERIAL / IDENTITY:	<u>Ti 8-1MO-1V, TITANIUM</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>ENGINE FUEL LINES & COMPONENTS</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /92 POSF 2926</u>
TEST DATE START:	<u>2 APR 97</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	LI	L	LI	L	LI					CN	W	W	
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND					CN	W	W		
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND					CN	W	W		
AVG. WT. (gms)	5.7927	5.7931	6.0130	6.0132	5.8520	5.8525									
GAIN / LOSS (gms)		+.0004		+.0002		+.0005					CN	W	W		
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)							GENERAL		
							JP-8		JP-8 + 100		JP-8 + 100 x4			OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
COLOR (7 DAYS)	C4	C5	C3	C6	C6	C6	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	272	99	429	74	675	94	50	4	300	57	569	241	150/600	O	O	O
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	IIM37	MATERIAL / IDENTITY:	4130 IVD COATING, ION VAPOR DEPOSIT
TEST TEMPERATURE (°F)	325	USE:	ENGINE FUEL LINES & COMPONENTS
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz Dearborn 8Q462 (Normal and x4 Concentrations) /92 POSF 2926
TEST DATE START:	14 AUG 97	JP-8 BASELINE FUEL:	92 POSF 2926 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	LI	L	LI	L	LI	CN	W	W					
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND	CN	W	W						
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND	CN	W	W						
AVG. WT. (gms)	15.8705	15.8727	15.8982	15.9003	15.8913	15.8897									
GAIN / LOSS (gms)		+.0022		+.0021		-.0016	CN	W	W						
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							JP-8		JP-8 + 100		JP-8 + 100 x4			GENERAL OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
COLOR (7 DAYS)	C3	C5	C3	C5	C4	C5	C	C2	C	C2	C	C2	W	W	W	
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	260	147	399	113	591	176	50	4	300	57	569	241	150/600	O	O	O
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	160	NE	630	NE	650	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;		
	OT =	Material Tested Beyond Temperature Range	O =	Outside Allowable Requirement
	N/A =	Not applicable;	CN =	Control
	GT =	Greater than 500 ppb	LT =	Less than 500 ppb
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	24 APR 98
UDRI TECH:	A. BEHME
UTC ENG:	J. LEONE
UDRI P.I. ENG:	D.H. KALT
A.F. AUT. W./MLSA:	L. PERKINS
A.F. AUT. WL/POSF	S. A. ANDERSON

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>IIM40</u>	MATERIAL / IDENTITY:	<u>303 STAINLESS STEEL</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>ENGINE FUEL LINES & COMPONENTS</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /92 POSF 2926</u>
TEST DATE START:	<u>2 DEC 97</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST	JP8	+100	X4						
COLOR	L	LI	L	LI	L	LI						CN	W	W	
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND						CN	W	W	
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND						CN	W	W	
AVG. WT. (gms)	26.6278	26.6283	26.4266	26.4268	26.8950	26.8951									
GAIN / LOSS (gms)		+.0005		+.0002		+.0001						CN	W	W	
MICROSCOPY EVAL.															

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)							GENERAL OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
COLOR (7 DAYS)	C6	C5	C5	C6	C4	C6	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	190	133	407	112	612	165	50	4	300	57	569	241	150/600	O	O	O
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	160	NE	630	NE	650	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	<u>24 APR 98</u>
UDRI TECH:	<u>A. BEHME</u>
UTC ENG:	<u>J. LEONE</u>
UDRI P.I. ENG:	<u>D.H. KALT</u>
A.F. AUT. W./MLSA:	<u>L. PERKINS</u>
A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>IIM41</u>	MATERIAL / IDENTITY:	<u>TI-CP-70 Titanium</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>ENGINE FUEL LINES & COMPONENTS</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz Dearborn 8Q462 (Normal and x4 Concentrations) /92 POSF 2926</u>
TEST DATE START:	<u>2 DEC 97</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE						EVALUATION OF TEST RESULTS								
	RESULTS						OBSERVATIONS AND REFERENCES						OVERALL EVALUATION		
	JP-8		JP-8 +100		JP8+100 (X4)										
	PRE	POST	PRE	POST	PRE	POST							JP8	+100	X4
	COLOR	L	L2	L	L2	L	L2					CN	W	W	
PITTING (VISUAL)	ND	ND	ND	ND	ND	ND					CN	W	W		
PITTING (MICROSCOPY)	ND	ND	ND	ND	ND	ND					CN	W	W		
AVG. WT. (gms)	9.8310	9.8315	9.8023	9.8027	9.8681	9.8683									
GAIN / LOSS (gms)		+.0005		+.0004		+.0002					CN	W	W		
MICROSCOPY EVAL.							+100,X4 Blue Tint, EDS- Phosphorus								

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE 4 X 7 DAY PERIODS (28 DAYS)						CONTROL FUEL PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)						SPEC. RANGE FOR JP-8 MIN / MAX	TEST RESULTS		
							PRE (NEW) VS. POST (STRESSED 7 DAYS @ 325°F)							GENERAL OBSERVATIONS		
	7	28	7	28	7	28	PRE	POST	PRE	POST	PRE	POST		JP8	+100	X4
COLOR (7 DAYS)	C4	C5	C6	C6	C5	C6	C	C2	C	C2	C	C2		W	W	W
CONDUCTIVITY (AVG. of 4)	PRE	POST	PRE	POST	PRE	POST										
PS/M AT 72° F	238	147	406	98	611	168	50	4	300	57	569	241	150/600	O	O	O
GRAPHITE FURN/ICP (PPB)	7 DAY	28 DAY	7 DAY	28 DAY	7 DAY	28 DAY										
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE
	NE	NE	NE	NE	NE	NE	NE		NE		NE			NE	NE	NE

NOTES:

Metallic Color:	L =	Light (No Deposit)	L1 - L2 =	Discoloration/Deposits
Fuel Color:	C =	Clear	C1 - C6 =	Light to Dark
Designations:	NE =	Not Evaluated;	ND =	Not Detected; BD = Below Detection
Comparisons:	W =	Within Allowable Requirement;	O =	Outside Allowable Requirement
	OT =	Material Tested Beyond Temperature Range	CN =	Control
	N/A =	Not applicable;	LT =	Less than 500 ppb
	GT =	Greater than 500 ppb		
	NSR =	No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	<u>24 APR 98</u>
UDRI TECH:	<u>A. BEHME</u>
UTC ENG:	<u>J. LEONE</u>
UDRI P.I. ENG:	<u>D.H. KALT</u>
A.F. AUT. W./MLSA:	<u>L. PERKINS</u>
A.F. AUT. WL/POSF	<u>S. A. ANDERSON</u>

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.O.1</u>	MATERIAL / IDENTITY:	<u>UNICELLULAR BUNA-N</u>
TEST TEMPERATURE (°F)	<u>225</u>	USE:	<u>AIRFRAME, FUEL SYSTEM LEVEL CONTROL FLOAT</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>27 JUL '95</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS						
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION			
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4	
	POST	POST	POST												
TENSILE (PSI)															
ELONGATION (%)															
VOLUME SWELL (%)															
HARD'S; a) SHORE A (PTS)															
b) PENCIL															
COMP. SET (avg. 2 spcm's)															
LAP SHEAR (PSI)															
COHESION (%)															
TAPE ADHESION (P/F)															
PEEL STRENGTH (LB/IN)															
LAMINAR SHEAR (PSI)															
RESISTIVITY (OHM-CM)															
TORQUE (INCH -LBS.)															
RUPTURE PRESS. (IN.HG)															
VISUAL OBSERVATIONS	P	P	P	P		P		P		P	P	P	W	W	W

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL						EVALUATION OF TEST RESULTS				
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C2	C1	C1	C	C1	C	C1	C	C1			W	W	W
ACID NO. mgKOH/gm	.003	.001	.003	.001	.004	.001	.003	.003	.003		0.015	W	W	W
GUMS mg/100ml	2.4	3.8	11.4	2	3.2	4.4	4.8	9.6	3.8		7	W	W	O
HYDROPEROXIDES mM/l	.02	BD	BD	.004	.01	0	.01	0	.01			O	W	W
CONDUCTIVITY pS/m @72°F	41	328	503	108	39	248	131	912	410	150	600	O	W	W
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF: S. A. ANDERSON

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	I.O.2	MATERIAL / IDENTITY:	UNICELLULAR POLYURETHANE
TEST TEMPERATURE (°F)	225	USE:	AIRFRAME, FUEL SYSTEMS, LEVEL CONTROL FLOAT
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	27 JUL '95	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS						
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION			
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4	
	POST	POST	POST												
TENSILE (PSI)															
ELONGATION (%)															
VOLUME SWELL (%)															
HARD’S; a) SHORE A (PTS)															
b) PENCIL															
COMP. SET (avg. 2 spec’s)															
LAP SHEAR (PSI)															
COHESION (%)															
TAPE ADHESION (P/F)															
PEEL STRENGTH (LB/IN)															
LAMINAR SHEAR (PSI)															
RESISTIVITY (OHM-CM)															
TORQUE (INCH -LBS.)															
RUPTURE PRESS. (IN.HG)															
VISUAL OBSERVATIONS	P	P	P	P		P		P		P	P	P	W	W	W

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C1	C1	C1	C	C1	C	C1	C	C1			W	W	W
ACID NO. mgKOH/gm	.003	.002	.006	.001	.004	.001	.003	.003	.003		0.015	W	W	W
GUMS mg/100ml	1.8	3.8	12.2	2	3.2	4.4	4.8	9.6	3.8		7	W	W	O
HYDROPEROXIDES mM/l	.02	BD	BD	.004	0.01	0	0.01	0	0.01			O	W	W
CONDUCTIVITY pS/m @72°F	47	284	550	108	39	248	131	912	410	150	600	O	W	W
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.O.3</u>	MATERIAL / IDENTITY:	<u>POLYURETHANE, SAMPLE #1</u>
TEST TEMPERATURE (°F)	<u>225</u>	USE:	<u>AIRFRAME, FUEL SYSTEM LEVEL CONTROL FLOAT</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>27 JUL '95</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS						
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION			
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4	
	POST	POST	POST												
TENSILE (PSI)															
ELONGATION (%)															
VOLUME SWELL (%)															
HARD’S; a) SHORE A (PTS)															
b) PENCIL															
COMP. SET (avg. 2 spec’s)															
LAP SHEAR (PSI)															
COHESION (%)															
TAPE ADHESION (P/F)															
PEEL STRENGTH (LB/IN)															
LAMINAR SHEAR (PSI)															
RESISTIVITY (OHM-CM)															
TORQUE (INCH -LBS.)															
RUPTURE PRESS. (IN.HG)															
VISUAL OBSERVATIONS	P	P	P	P		P		P		P	P	P	W	W	W

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C2	C1	C1	C	C1	C	C1	C	C1			W	W	W
ACID NO. mgKOH/gm	.003	.003	.004	.001	0.004	.001	0.003	0.003	0.003		0.015	W	W	W
GUMS mg/100ml	1.2	2.2	11.8	2	3.2	4.4	4.8	9.6	3.8		7	W	W	O
HYDROPEROXIDES mM/l	.02	BD	BD	.004	0.01	0	0.01	0	0.01			O	W	W
CONDUCTIVITY pS/m @72°F	52	271	650	108	39	248	131	912	410	150	600	O	W	O
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.O.4</u>	MATERIAL / IDENTITY:	<u>POLYURETHANE, SAMPLE #2</u>
TEST TEMPERATURE (°F)	<u>225</u>	USE:	<u>AIRFRAME, FUEL SYSTEM, LEVEL CONTROL FLOAT</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>11 OCT '95</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS						
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION			
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4	
	POST	POST	POST												
TENSILE (PSI)															
ELONGATION (%)															
VOLUME SWELL (%)															
HARD’S; a) SHORE A (PTS)															
b) PENCIL															
COMP. SET (avg. 2 spec’s)															
LAP SHEAR (PSI)															
COHESION (%)															
TAPE ADHESION (P/F)															
PEEL STRENGTH (LB/IN)															
LAMINAR SHEAR (PSI)															
RESISTIVITY (OHM-CM)															
TORQUE (INCH -LBS.)															
RUPTURE PRESS. (IN.HG)															
VISUAL OBSERVATIONS	P	P	P	P		P		P		P	P	P	W	W	W

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C2	C1	C2	C	C1	C	C1	C	C1			W	W	W
ACID NO. mgKOH/gm	.004	.002	.004	.001	0.004	.001	0.003	0.003	0.003		0.015	W	W	W
GUMS mg/100ml	2.4	4.6	13.0	2	3.2	4.4	4.8	9.6	3.8		7	W	W	O
HYDROPEROXIDES mM/l	.01	BD	BD	.004	0.01	0	0.01	0	0.01			W	W	W
CONDUCTIVITY pS/m @72°F	59	621	562	108	39	248	131	912	410	150	600	O	W	W
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.O.5</u>	MATERIAL / IDENTITY:	<u>POLYURETHANE, SAMPLE #3</u>
TEST TEMPERATURE (°F)	<u>225</u>	USE:	<u>AIRFRAME, FUEL SYSTEM LEVEL CONTROL FLOAT</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>11 OCT '95</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS						
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION			
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4	
	POST	POST	POST												
TENSILE (PSI)															
ELONGATION (%)															
VOLUME SWELL (%)															
HARD'S; a) SHORE A (PTS)															
b) PENCIL															
COMP. SET (avg. 2 spec's)															
LAP SHEAR (PSI)															
COHESION (%)															
TAPE ADHESION (P/F)															
PEEL STRENGTH (LB/IN)															
LAMINAR SHEAR (PSI)															
RESISTIVITY (OHM-CM)															
TORQUE (INCH -LBS.)															
RUPTURE PRESS. (IN.HG)															
VISUAL OBSERVATIONS	P	P	P	P		P		P		P	P	P	W	W	W

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C2	C1	C1	C	C1	C	C1	C	C1			W	W	W
ACID NO. mgKOH/gm	.004	.002	.005	.001	0.004	.001	0.003	.003	0.003		0.015	W	W	W
GUMS mg/100ml	2.4	4.2	12.4	2	3.2	4.4	4.8	9.6	3.8		7	W	W	O
HYDROPEROXIDES mM/l	.01	BDL	BDL	.004	0.01	0	0.01	0	0.01			W	W	W
CONDUCTIVITY pS/m @72°F	55	267	641	108	39	248	131	912	410	150	600	O	W	O
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.O.6</u>	MATERIAL / IDENTITY:	<u>POLYURETHANE, SAMPLE #4</u>
TEST TEMPERATURE (°F)	<u>225</u>	USE:	<u>AIRFRAME, FUEL SYSTEM, LEVEL CONTROL FLOAT</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>11 OCT '95</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS	P	P	P	P	P		P		P	P	P	W	W	W

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C2	C1	C2	C	C1	C	C1	C	C1			W	W	W
ACID NO. mgKOH/gm	.004	.003	.005	.001	0.004	.001	0.003	0.003	0.003		0.015	W	W	W
GUMS mg/100ml	1.8	4.0	11.6	2	3.2	4.4	4.8	9.6	3.8		7	W	W	O
HYDROPEROXIDES mM/l	.01	BD	BD	.004	0.01	0	0.01	0	0.01			W	W	W
CONDUCTIVITY pS/m @72°F	53	263	564	106	39	248	131	912	410	150	600	O	W	W
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
 Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
 W = Within Allowable Requirement; O = Outside Allowable Requirement
 OT = Material Tested Beyond Temperature Range
 N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
 UDRI TECH: J. DUES
 UDRI ENG: B. WILT
 UDRI P.L. ENG: D.H. KALT
 A.F. AUT. W./MLSE: A. FLETCHER
 A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.O.7</u>	MATERIAL / IDENTITY:	<u>FLOATS, FOAM</u>
TEST TEMPERATURE (°F)	<u>225</u>	USE:	<u>AIRFRAME, for AEROSPACE LEVEL CONTROL VALVES</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>24 AUG '95</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS						
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION			
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4	
	POST	POST	POST												
TENSILE (PSI)															
ELONGATION (%)															
VOLUME SWELL (%)															
HARD’S; a) SHORE A (PTS)															
b) PENCIL															
COMP. SET (avg. 2 spec’s)															
LAP SHEAR (PSI)															
COHESION (%)															
TAPE ADHESION (P/F)															
PEEL STRENGTH (LB/IN)															
LAMINAR SHEAR (PSI)															
RESISTIVITY (OHM-CM)															
TORQUE (INCH -LBS.)															
RUPTURE PRESS. (IN.HG)															
VISUAL OBSERVATIONS	P	P	P	P		P		P		P	P	P	W	W	W

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C1	C1	C1	C	C1	C	C1	C	C1			W	W	W
ACID NO. mgKOH/gm	.003	.003	.004	.001	.004	.001	.003	.003	.003		0.015	W	W	W
GUMS mg/100ml	1.6	5.0	12.4	2	3.2	4.4	4.8	9.6	3.8		7	W	W	O
HYDROPEROXIDES mM/l	.01	BD	BD	.004	0.01	0	0.01	0	0.01			W	NE	NE
CONDUCTIVITY pS/m @72°F	48	273	567	108	39	248	131	912	410	150	600	O	W	W
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
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DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.O.8/I.G.13</u>	MATERIAL / IDENTITY:	<u>CORK</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL SYSTEM, LEVEL CONTROL FLOAT</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>27 AUG '96</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS						
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION			
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4	
	POST	POST	POST												
TENSILE (PSI)															
ELONGATION (%)															
VOLUME SWELL (%)															
HARD’S; a) SHORE A (PTS)															
b) PENCIL															
COMP. SET (avg. 2 spec’s)															
LAP SHEAR (PSI)															
COHESION (%)															
TAPE ADHESION (P/F)															
PEEL STRENGTH (LB/IN)															
LAMINAR SHEAR (PSI)															
RESISTIVITY (OHM-CM)															
TORQUE (INCH -LBS.)															
RUPTURE PRESS. (IN.HG)															
VISUAL OBSERVATIONS	P	P	P	P		P		P		P	P	P	W	W	W

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	CC1	C1	C1	C	C1	C	C1	C	C1			W	W	W
ACID NO. mgKOH/gm	0.005	0.005	.007	.001	.001	.001	.002	.003	.003		0.015	W	W	W
GUMS mg/100ml	2.4	17.6	6.6	2	.8	4.4	2.8	9.6	8.6		7	W	W	W
HYDROPEROXIDES mM/l	BD	0.02	0.02	.004	.002	0	.032	0	.018					
CONDUCTIVITY pS/m @72°F	107	291	539	108	66	248	131	912	410	150	600	O	W	W
VISUAL OBSERVATIONS	0.1242	0.1542	0.1106									W	W	W

NOTES:

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Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>LP.1/IA.5</u>	MATERIAL / IDENTITY:	<u>EPOXY, EPON</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, POTTING COMPOUND</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>13 OCT '95</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)	2949	2880	3208	3195	15				-7.6	-9.9	+.4	W	W	W
COHESION (%)	100	100	100	100		100%			P	P	P	W	W	W
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.001	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	.6	.8	4.4	2.8	9.6	8.6		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.001	.002	0	.032	0	.018			NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	100	66	248	131	912	410	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
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DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>1P.2.1</u>	MATERIAL / IDENTITY:	<u>POLYSULFIDE/(FILM), MIL-S-8516</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, POTTING COMPOUND</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>22 JAN '95</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	116	199	211	256	20%				-55	-22	-18	O	W	W
ELONGATION (%)	68	36	26	208	20				-67	-83	-88	O	O	O
VOLUME SWELL (%)	-32	-39	-42	NA		-20			F	F	F	O	O	O
HARD'S; a) SHORE A (PTS)	41	60	68	47	10pts		10pts		-6	+13	+21	W	O	O
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)	8	100	100	NA		100			F	P	P	O	W	W
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)	2	14	13	NA		20			F	F	F	O	O	O
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.001	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	2	.8	4.4	2.8	9.6	8.6		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.002	0	.032	0	.018			NE	NE	NE
CONDUCTIVITY pS/m @72°F	NE	NE	NE	108	66	248	131	912	410	150	600	NE	NE	NE
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
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UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>1.P.2.2</u>	MATERIAL / IDENTITY:	<u>MIL-S-8516, POLYSULFIDE</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, POTTING COMPOUND, CONNECTOR APPLICATION</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>NOV 96</u>	JP-8 BASELINE FUEL:	<u>92 POSF 2926 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS						
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION			
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4	
	POST	POST	POST												
TENSILE (PSI)															
ELONGATION (%)															
VOLUME SWELL (%)															
HARD’S; a) SHORE A (PTS)															
b) PENCIL															
COMP. SET (avg. 2 spec’s)															
LAP SHEAR (PSI)															
COHESION (%)															
TAPE ADHESION (P/F)															
PEEL STRENGTH (LB/IN)															
LAMINAR SHEAR (PSI)															
RESISTIVITY (OHM-CM)															
TORQUE (INCH -LBS.)															
RUPTURE PRESS. (IN.HG)															
VISUAL OBSERVATIONS	*F	*F	*F	P		P				F	F	F	O	O	O

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)				C	C1	C	C1	C	C1					
ACID NO. mgKOH/gm				.001	.001	.001	.002	.003	.003		0.015			
GUMS mg/100ml				.6	.8	4.4	2.8	9.6	8.6		7			
HYDROPEROXIDES mM/l				.001	.002	0	.038	0	.018					
CONDUCTIVITY pS/m @72°F				100	66	248	131	912	410	150	600			
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
 Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
 W = Within Allowable Requirement; O = Outside Allowable Requirement
 OT = Material Tested Beyond Temperature Range
 N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
 UDRI TECH: J. DUES
 UDRI ENG: B. WILT
 UDRI P.L. ENG: D.H. KALT
 A.F. AUT. W./MLSE: A. FLETCHER
 A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

II.P.2.2 at 200°F

CS-3100

Insulation Resistance

As received

Cure a Diallyl Phthalate

Case to Terminal

2P

0.60E+10

1P

0.90E+10

3P

1.00E+11

4P

8.50E+10

5P

9.80E+10

Terminal to Terminal

3.00E+11

2P

2.10E+11

1P

2.10E+11

3P

2.60E+11

4P

2.60E+11

5P

3.10E+11

After 28 days @ 200°F

Diallyl Phthalate

Case to Terminal

in JP-8

2P

9.70E+10

in JP-8/BETZ

1P

9.20E+10

in JP-8/BETZ(4)

3P

1.40E+11

Terminal to Terminal

in JP-8

2P

2.50E+11

in JP-8/BETZ

1P

3.40E+11

in JP-8/BETZ(4)

3P

3.70E+11

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	LP.3	MATERIAL / IDENTITY:	FLUOROSILICONE, AMS 3361
TEST TEMPERATURE (°F)	200	USE:	AIRFRAME, POTTING COMPOUND
EXPOSURE TIME (DAYS)	28	TEST ADDITIVE/FUEL:	Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	NTP	JP-8 BASELINE FUEL:	92 POSF 2926 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE FOR JP-8		GENERAL OBSERVATIONS		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4						
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)														
ACID NO. mgKOH/gm											0.015			
GUMS mg/100ml											7			
HYDROPEROXIDES mM/l														
CONDUCTIVITY pS/m @72°F										150	600			
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.P.4</u>	MATERIAL / IDENTITY:	<u>URETHANE</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, POTTING COMPOUND</u>
EXPOSURE TIME (DAYS)	<u>28</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>NTP</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD’S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm’s)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS *	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) *F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)														
ACID NO. mgKOH/gm											0.015			
GUMS mg/100ml											7			
HYDROPEROXIDES mM/l														
CONDUCTIVITY pS/m @72°F										150	600			
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	I.B.4	MATERIAL / IDENTITY:	NITRILE
TEST TEMPERATURE (°F)	200	USE:	AIRFRAME, FUEL TANK BLADDER INNERLINER
EXPOSURE TIME (DAYS)	7	TEST ADDITIVE/FUEL:	Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	9 JUN '94	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	1982	2136	2116	2441	50%				-19	-13	-13	W	W	W
ELONGATION (%)	369	357	348	568	35				35	37	39	W	OT	OT
VOLUME SWELL (%)	-2	-3	-3	N/A				12	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C1	C1	C1	C	C1	C	C1	C	C1			W	W	W
ACID NO. mgKOH/gm	NE	NE	NE	0.001	0.002	0.001	0.002	0.003	0.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	2	4.8	4.4	2.8	9.6	8.6		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	0.004	0.037	0	0.038	0	0.018			NE	NE	NE
CONDUCTIVITY pS/m @72°F	502	880	1191	108	39	248	131	912	410	150	600	W	O	O
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 17 Sept '98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF: S.A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.B.5</u>	MATERIAL / IDENTITY:	<u>BLADDER TANK, POLYURETHANE</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL TANK BLADDER, INNERLINER</u>
EXPOSURE TIME (DAYS)	<u>7</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>9 JUN '94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	2411	2589	2481	3292	50%				-27	-21	-25	W	W	W
ELONGATION (%)	610	596	605	449	35%				+35	+33	+35	W	W	W
VOLUME SWELL (%)	13	11	29	N/A				12%	F	P	F	OT	W	OT
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 specm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1					
ACID NO. mgKOH/gm	NE	NE	NE	.001	.002	.001	.002	.003	.003		0.015			
GUMS mg/100ml	NE	NE	NE	2	4.8	4.4	2.8	9.6	8.6		7			
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.037	0	.038	0	.018					
CONDUCTIVITY pS/m @72°F	135	271	635	108	39	248	131	912	410	150	600	O	W	O
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	I.C.2	MATERIAL / IDENTITY:	COATING, POLYURETHANE, MIL-C-27725
TEST TEMPERATURE (°F)	200	USE:	AIRFRAME, INTEGRAL FUEL TANK COATING
EXPOSURE TIME (DAYS)	7	TEST ADDITIVE/FUEL:	Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	9 JUNE '94	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL	>6H	>6H	>6H	>6H	O				P	P	P	W	W	W
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)	P	P	P	P		P			P	P	P	W	W	W
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1					
ACID NO. mgKOH/gm	NE	NE	NE	.001	.002	.001	.002	.003	.003		0.015			
GUMS mg/100ml	NE	NE	NE	2	4.8	4.4	2.8	9.6	8.6		7			
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.037	0	.038	0	.018					
CONDUCTIVITY pS/m @72°F	27	683	423	108	39	248	131	912	410	150	600	O	O	W
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: _____
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.D.2/L.C.4</u>	MATERIAL / IDENTITY:	<u>MANGANESE, MIL-S-8802</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, INTEGRAL FUEL TANK SEALANT/COATING</u>
EXPOSURE TIME (DAYS)	<u>7</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>9 JUNE '94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	377	437	388	395		200			P	P	P	W	W	W
ELONGATION (%)	240	212	215	271		150%			P	P	P	W	W	W
VOLUME SWELL (%)	10	12	-1	N/A				8%	F	F	P	O	O	W
HARD'S; a) SHORE A (PTS)	53	53	53	53		30 PTS			P	P	P	W	W	W
b) PENCIL														
COMP. SET (avg. 2 spec's)														
LAP SHEAR (PSI)														
COHESION (%)	100	100	100	N/A		100%			P	P	P	W	W	W
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)	26	28	27	N/A		12			P	P	P	W	W	W
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS *	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) *F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1					
ACID NO. mgKOH/gm	NE	NE	NE	.001	.002	.001	.002	.003	.003		0.015			
GUMS mg/100ml	NE	NE	NE	2	4.8	4.4	2.8	9.6	8.6		7			
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.037	0	.038	0	.018					
CONDUCTIVITY pS/m @72°F	10	166	363	108	39	248	131	912	410	150	600	O	W	W
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.E.1</u>	MATERIAL / IDENTITY:	<u>EPOXY GRAPHITE</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, INTEGRAL FUEL TANK COMPOSITE</u>
EXPOSURE TIME (DAYS)	<u>7</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>9 JUNE '94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)	8971	10107	9463	11141	20%				20	9	15	W	W	W
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.002	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	2	4.8	4.4	2.8	9.6	8.6		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.001	.002	0	.032	0	.018			NE	NE	NE
CONDUCTIVITY pS/m @72°F	45	153	375	108	39	248	131	912	410	150	600	O	W	W
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

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Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	I.E.2	MATERIAL / IDENTITY:	GRAPHITE BISMALIEMIDE IM7/5250-4-(bmi)
TEST TEMPERATURE (°F)	200	USE:	AIRFRAME, INTEGRAL FUEL TANK COMPOSITE
EXPOSURE TIME (DAYS)	7	TEST ADDITIVE/FUEL:	Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	9 JUNE '94	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)														
ELONGATION (%)														
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)	11720	11960	12780	12330	20%				5	3	4	W	W	W
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.002	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	2	4.8	4.4	2.8	9.6	8.6		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.037	0	.038	0	.018			NE	NE	NE
CONDUCTIVITY pS/m @72°F	55	161	392	108	39	248	131	912	410	150	600	O	W	W
VISUAL OBSERVATIONS														

NOTES:

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OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

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A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>LF.3</u>	MATERIAL / IDENTITY:	<u>POLYURETHANE, ESTER, YELLOW TYPE II</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL TANK FOAM (ESM) MIL-B-83054</u>
EXPOSURE TIME (DAYS)	<u>7</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>9 JUNE '94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	16	15	16	16	40%				0	6	0	W	W	W
ELONGATION (%)	319	328	320	274	40				+16	+20	+27	W	W	W
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)	N/A	N/A	N/A	N/A										
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS *	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) *F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.002	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	.2	4.8	4.4	2.8	9.6	8.6		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.037	0	.038	0	.018			NE	NE	NE
CONDUCTIVITY pS/m @72°F	47	325	396	108	39	248	131	912	410	150	600	O	W	W
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
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W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
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Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	LF.4	MATERIAL / IDENTITY:	POLYURETHANE, ETHER, BLUE TYPE IV
TEST TEMPERATURE (°F)	200	USE:	AIRFRAME, FUEL TANK FOAM (ESM) MIL-B-83054
EXPOSURE TIME (DAYS)	7	TEST ADDITIVE/FUEL:	Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	9 JUNE '94	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	10	10	9	9	40%				+11	+11	0	W	W	W
ELONGATION (%)	150	146	150	115	40				+30	+27	+30	W	W	W
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)	N/A	N/A	N/A	N/A										
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.002	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	2	4.8	4.4	2.8	9.6	8.6		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.037	0	.038	0	.018			NE	NE	NE
CONDUCTIVITY pS/m @72°F	108	489	519	108	39	248	131	912	410	150	600	O	W	W
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

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DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.L. ENG: D.H. KALT
A.F. AUT. W./MLSE: A. FLETCHER
A.F. AUT. WL/POSF S. A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>LF.5</u>	MATERIAL / IDENTITY:	<u>POLYURETHANE (ETHER), GREY CONDUCTIVE CLASS I</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL TANK FOAM (ESM) MIL-F-87206</u>
EXPOSURE TIME (DAYS)	<u>7</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>9 JUNE '94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	16	15	16	19	40%				-16	-21	-5	W	W	W
ELONGATION (%)	131	123	138	133	40				-2	-8	+4	W	W	W
VOLUME SWELL (%)														
HARD'S; a) SHORE A (PTS)														
b) PENCIL														
COMP. SET (avg. 2 spcm's)														
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)	2.76E11	3.06E11	1.84E11						P	P	P	W	W	W
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) *F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.002	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	2	4.8	4.4	2.8	9.6	8.6		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.037	0	.038	0	.018			NE	NE	NE
CONDUCTIVITY pS/m @72°F	145	303	538	108	39	248	131	912	410	150	600	O	W	W
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
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Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>I.G.2</u>	MATERIAL / IDENTITY:	<u>NITRILE, MIL-P-25732</u>
TEST TEMPERATURE (°F)	<u>200</u>	USE:	<u>AIRFRAME, FUEL SYSTEM GASKETS "O" RING</u>
EXPOSURE TIME (DAYS)	<u>7</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>9 JUNE '94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	1150	1112	1185	1489	25%				-23	-25	-20	W	W	W
ELONGATION (%)	153	148	155	188	25				-19	-21	-19	W	W	W
VOLUME SWELL (%)	16	16	15	N/A		0		25	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	67	67	66	74	5		5		-7	-7	-8	OT	OT	OT
b) PENCIL														
COMP. SET (avg. 2 spcm's)	27	37	31	N/A				50	P	P	P	W	W	W
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	NE	NE	NE	C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	NE	NE	NE	.001	.002	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml	NE	NE	NE	2	4.8	4.4	2.8	9.6	8.6		7	NE	NE	NE
HYDROPEROXIDES mM/l	NE	NE	NE	.004	.037	0	.038	0	.018			NE	NE	NE
CONDUCTIVITY pS/m @72°F	4	160	680	108	39	248	131	912	410	150	600	O	W	O
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
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A.F. AUT. WL/POSF: S.A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	I.G.6/ILG.9	MATERIAL / IDENTITY:	FLUOROCARBON, MIL-R-83248
TEST TEMPERATURE (°F)	200	USE:	ENGINE/AIRFRAME, GASKET "O" RING
EXPOSURE TIME (DAYS)	7	TEST ADDITIVE/FUEL:	Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980
TEST DATE START:	9 JUNE '94	JP-8 BASELINE FUEL:	93 POSF 2980 + (JP-8 Additives)

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	1846	1767	1734	1823	20%				+1	-3	-5	W	W	W
ELONGATION (%)	212	200	200	193	20%				+10	+4	+4	W	W	W
VOLUME SWELL (%)	4	4	3	N/A		0		10%	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	75	75	74	75	5		5		O	O	-1	W	W	W
b) PENCIL														
COMP. SET (avg. 2 spcm's)	9	7	9	N/A				60	P	P	P	W	W	W
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) *F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)				C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm				.001	.002	.001	.002	.003	.003		0.015	NE	NE	NE
GUMS mg/100ml				2	4.8	4.4	2.8	9.6	8.6		7	NE	NE	NE
HYDROPEROXIDES mM/l				.004	.037	0	.038	0	.018			NE	NE	NE
CONDUCTIVITY pS/m @72°F	40	441	491	108	39	248	131	912	410	150	600	O	W	W
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
W = Within Allowable Requirement; O = Outside Allowable Requirement
OT = Material Tested Beyond Temperature Range
N/A = Not applicable; NSR = No Spec. Req. and/or 4 (x) Additive Concentration

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J. DUES
UDRI ENG: B. WILT
UDRI P.I. ENG: D.H. KALT
A.F. AUT. W/MLSE: A. FLETCHER
A.F. AUT. WL/POSF: S.A. ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>II.G.2</u>	MATERIAL / IDENTITY:	<u>FLUORISILICONE, MIL-R-25988</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>ENGINE/AIRFRAME, FUEL SYSTEM GASKET “O” RING</u>
EXPOSURE TIME (DAYS)	<u>7</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>7 SEPT ‘94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		REQUIREMENT				JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST		DECREASE	MIN VALUE	INCREASE	MAX VALUE						
TENSILE (PSI)	124	157	229	896	45%				-86	-82	-74	OT	W	W
ELONGATION (%)	97	121	153	214	35				-55	-43	-29	OT	W	W
VOLUME SWELL (%)	11	11	11	N/A		0		25	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	40	41	45	67	20				27	26	22	OT	W	W
b) PENCIL														
COMP. SET (avg. 2 spcm's)	77	61	53	N/A				30	F	F	F	OT	W	W
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)				C	C1	C	C1	C	C1			NE	NE	NE
ACID NO. mgKOH/gm	.003	.010	.004	.001	.003	.001	.006	.003	.008		0.015	W	W	W
GUMS mg/100ml				2	6.2	4.4	6.4	9.6	8.6		7	NE	NE	NE
HYDROPEROXIDES mM/l	.025	BAD EML	BAD EML	.004	.037	0	.038	0	.018			NE	NE	NE
CONDUCTIVITY pS/m @72°F	335	1830	870	108	125	248	144	912	410	150	600	W	O	O
VISUAL OBSERVATIONS														

NOTES:

Fuel Color:	C =	Clear	C1 - C6 = Light to Dark		
Designations:	NE =	Not Evaluated;	ND = Not Detected;	BD = Below Detection;	P = Pass; F = Fail
	W =	Within Allowable Requirement;		O = Outside Allowable Requirement	
	OT =	Material Tested Beyond Temperature Range			
	N/A =	Not applicable;	NSR = No Spec. Req. and/or 4 (x) Additive Concentration		

DATE:	<u>24 MAR 98</u>
UDRI TECH:	<u>J.DUES</u>
UDRI ENG:	<u>B.WILT</u>
UDRI P.I. ENG:	<u>D.H. KALT</u>
A.F. AUT. W./MLSE:	<u>A. FLETCHER</u>
A.F. AUT. WL/POSF	<u>S.A. ANDERSON</u>

* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists Between Material Degradation and Fuel Properties Degradation

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as “W”

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>IL.G.3/L.G.7</u>	MATERIAL / IDENTITY:	<u>FLUOROCARBON, MIL-R-83485</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>ENGINE/AIRFRAME, GASKET "O" RING</u>
EXPOSURE TIME (DAYS)	<u>7</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>7 SEPT '94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA				EVALUATION OF TEST RESULTS						
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	1194	1314	1211	1644	20%				-27	-20	-26	O	W	W
ELONGATION (%)	178	186	179	166	20				+7	+12	+8	W	W	W
VOLUME SWELL (%)	10	1	9	N/A		0		10	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	70	72	70	76	5		5		-6	-4	-6	O	W	W
b) PENCIL														
COMP. SET (avg. 2 spcm's)	40	33	37	N/A				60	P	P	P	W	W	W
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C3	C4	C2	C	C2	C	C2	C	C2			W	O	W
ACID NO. mgKOH/gm	0.004	0.007	0.005	.001	.002	.001	.003	.003	.01		0.015	W	W	W
GUMS mg/100ml	3.6	7.4	26	2	3	4.4	3.4	9.6	12.2		7	W	O	O
HYDROPEROXIDES mM/l	0.027	0.017	0.022	.004	NE	0	0.011	0.016	NE			W	W	W
CONDUCTIVITY pS/m @72°F	34	83	417	108	4	248	57	912	241	150	600	O	O	W
VISUAL OBSERVATIONS														

NOTES:

Fuel Color:	C =	Clear	C1 - C6 = Light to Dark
Designations:	NE =	Not Evaluated;	ND = Not Detected;
	W =	Within Allowable Requirement;	BD = Below Detection; P = Pass; F = Fail
	OT =	Material Tested Beyond Temperature Range	O = Outside Allowable Requirement
	N/A =	Not applicable;	NSR = No Spec. Req. and/or 4 (x) Additive Concentration

DATE:	<u>24 MAR 98</u>
UDRI TECH:	<u>J. DUES</u>
UDRI ENG:	<u>B. WILT</u>
UDRI P.I. ENG:	<u>D.H. KALT</u>
A.F. AUT. W./MLSE:	<u>A. FLETCHER</u>
A.F. AUT. WL/POSF	<u>S.A. ANDERSON</u>

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Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"

FUEL / MATERIAL COMPATIBILITY TEST RESULTS

TEST PLAN I.D. NO.	<u>ILG.7</u>	MATERIAL / IDENTITY:	<u>FLUOROSILICONE, MIL-R-25988</u>
TEST TEMPERATURE (°F)	<u>325</u>	USE:	<u>ENGINE/AIRFRAME, GASKET "O" RING</u>
EXPOSURE TIME (DAYS)	<u>7</u>	TEST ADDITIVE/FUEL:	<u>Betz/Dearborn 8Q462 ((Normal and x4 Concentrations) /93 POSF 2980</u>
TEST DATE START:	<u>18 OCT '94</u>	JP-8 BASELINE FUEL:	<u>93 POSF 2980 + (JP-8 Additives)</u>

MATERIAL PROPERTY TESTS (AVG. 5 SPECIMENS)	TEST MATERIAL / FUEL EXPOSURE			TEST EVALUATION CRITERIA					EVALUATION OF TEST RESULTS					
	RESULTS			CONTROL MAT MEASURED AT AMBIENT TEMP	ALLOWABLE TOLERANCE REQUIREMENT				COMPARISON TO CONTROL & ALLOWABLE REQUIREMENTS			OVERALL EVALUATION		
	JP-8	JP-8 +100	JP8+100 (X4)		DECREASE	MIN VALUE	INCREASE	MAX VALUE	JP-8	JP-8+100	JP-8+100x4	JP8	+100	X4
	POST	POST	POST											
TENSILE (PSI)	626	632	654	1088	45%				-42	-42	-40	W	W	W
ELONGATION (%)	126	132	130	126	35				0	+5	+3	W	W	W
VOLUME SWELL (%)	7	6	6	N/A		0		25	P	P	P	W	W	W
HARD'S; a) SHORE A (PTS)	68	67	69	76	20				-8	-9	-7	W	W	W
b) PENCIL														
COMP. SET (avg. 2 spcm's)	32	33	30	N/A				30	F	F	P	OT	OT	W
LAP SHEAR (PSI)														
COHESION (%)														
TAPE ADHESION (P/F)														
PEEL STRENGTH (LB/IN)														
LAMINAR SHEAR (PSI)														
RESISTIVITY (OHM-CM)														
TORQUE (INCH -LBS.)														
RUPTURE PRESS. (IN.HG)														
VISUAL OBSERVATIONS														

FUELS PROPERTY TESTS*	TEST FUEL / MATERIAL EXPOSURE			CONTROL FUEL										
	4 X 7 DAY PERIODS (28 DAYS)			PRE-NEW) VS. POST (STRESSED) °F 7 DAYS						SPECIFICATION RANGE		GENERAL		
	JP-8	JP-8 +100	JP8+100 (X4)	JP-8		JP-8 + 100		JP-8 + 100 x4		FOR JP-8		OBSERVATIONS		
	POST	POST	POST	PRE	POST	PRE	POST	PRE	POST	MIN	MAX	JP8	+100	X4
COLOR (7 DAYS)	C2	C2	C3	C	C2	C	C2	C	C2			W	W	W
ACID NO. mgKOH/gm	.006	.006	NE	.001	.007	.001	.006	.003	.008		0.015	W	W	NE
GUMS mg/100ml	8.2	11.8	17.4	2	3	4.4	3.4	9.6	12.2		7	O	O	O
HYDROPEROXIDES mM/l	.011	.003	NE	.004	.007	0	.015	0	.008			W	W	W
CONDUCTIVITY pS/m @72°F	71	158	518	108	123	248	141	912	555	150	600	O	W	W
VISUAL OBSERVATIONS														

NOTES:

Fuel Color: C = Clear C1 - C6 = Light to Dark
Designations: NE = Not Evaluated; ND = Not Detected; BD = Below Detection; P = Pass; F = Fail
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* Fuel Property Test Data Was Collected to Establish Whether Any Correlation Exists
Between Material Degradation and Fuel Properties Degradation

DATE: 24 MAR 98
UDRI TECH: J.DUES
UDRI ENG: B.WILT
UDRI P.I. ENG: D.H.KALT
A.F. AUT. W/MLSE: A.FLETCHER
A.F. AUT. WL/POSF S.A.ANDERSON

Overall Evaluation: When JP-8+100 and/or x4 Results are Equal To or Exceeds JP-8 Results, or within allowable tolerance requirement, the Overall Evaluation is Rated as "W"